FLEET OWNER

DEVOTED TO THE BETTER OPERATION AND MAINTENANCE OF ALL AUTOMOTIVE FLEETS

VOL. 36 FEBRUARY, 1946 NO. 2

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MAR 5 1946

witch to Better Living

FLICK OF THE FINGER makes modern ing more convenient, healthier . . . a hundred different ways. Night be- mes day . . . the family's meals are oked to perfection . . . wash day is duced to hours. These are only a few the home tasks performed by the same w cost *dependable* electric power that rns so many wheels of industry and ables millions of jobs to be provided.

cause *dependability* is a 24-hour a- y requirement of the electric industry, pendable trucks are used in great mbers to keep uninterrupted service intained. In this field, White trucks ve always enjoyed marked prefer- ce. As in so many others in which pendable, low cost service is the im- rtant factor, White trucks are leaders the electric power and light field.

THE WHITE MOTOR COMPANY
Cleveland, Ohio, U. S. A.

THE WHITE MOTOR COMPANY OF CANADA, LIMITED
Factory at Montreal

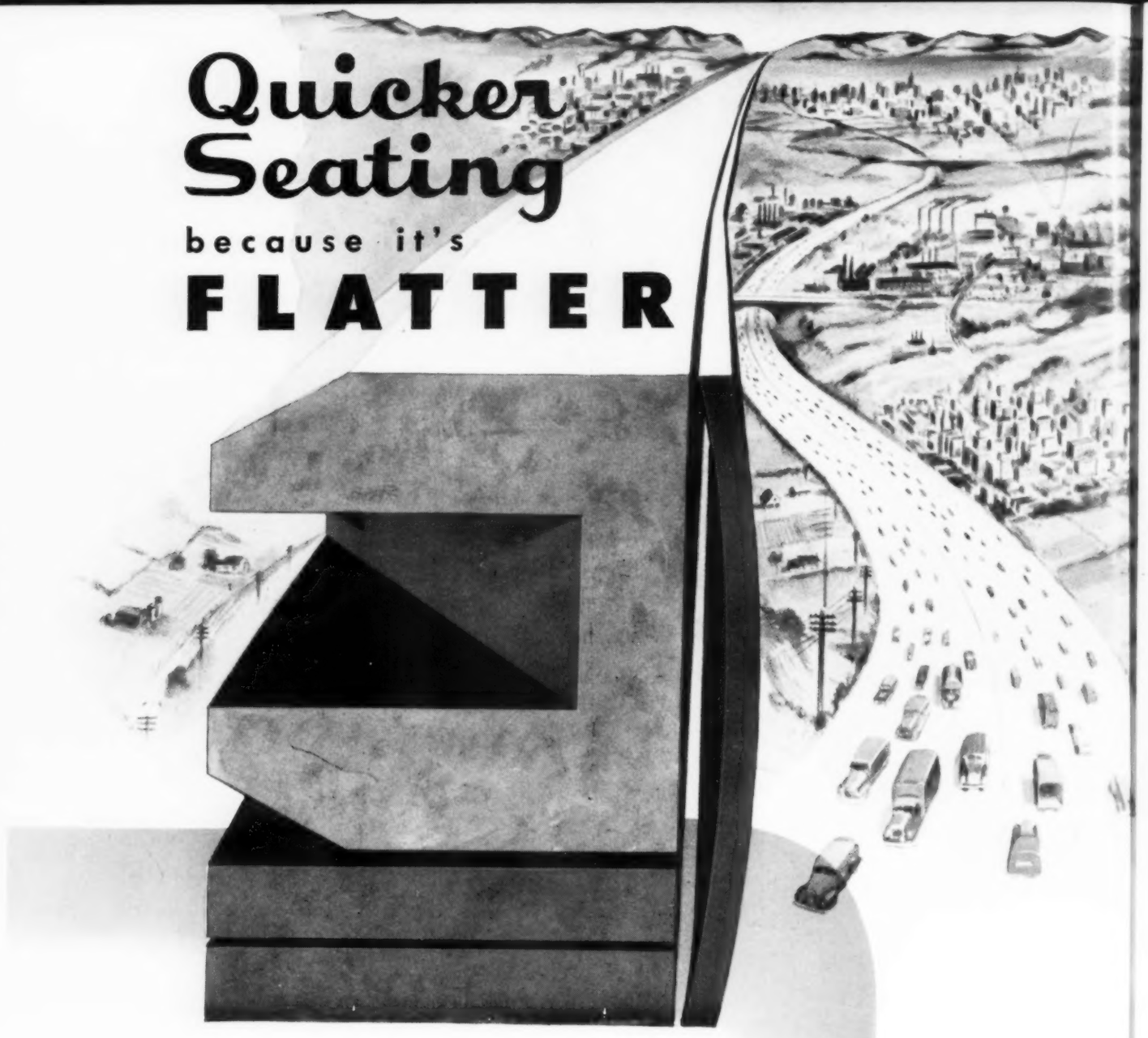
White

OR MORE THAN 45 YEARS THE REATEST NAME IN TRUCKS

Quicker Seating

because it's

FLATTER



Yes, Today's Ramco Rings are BETTER THAN EVER!

Quicker seating . . . better seating because the sides are flat and parallel! More life for motors, finer oil control and less chance of customer impatience spoiling your good ring job! That's what the greater flatness and extra precision finish found in today's Ramco Rings mean to you! Ramsey Accessories Mfg. Corp., 3713 Forest Park Blvd., St. Louis, Mo.; Canada— 569-71 King St. E., Toronto. Factories at St. Louis, Fruitport and Toronto.

Re-power with **RAMCO** Specially Designed **10 up**

TRUCK and FLEET PISTON RINGS

For Re-Ring and Re-Bore

Copyright 1945 by Ramsey Accessories Mfg. Co.

1253

Trailer built by Rogers Bros. Corp

$12,000 worth of tires for one 30-mile trip

A typical example of B. F. Goodrich development in tires

ARMY engineers wanted a secret load moved to the middle of a western desert. It weighed 230 tons. Time was all-important. How to get it there? Build a railroad? That was costly and slow. Move it by truck? No truck or trailer ever built would carry this load.

It was decided to design and build a huge trailer — if tires could be found to carry the load. And the trailer had to be built in 30 days. Engineers came to B. F. Goodrich with their tire problem — found just what they were looking for. B. F. Goodrich built special truck tires based on the desert tire principle developed previously by the company. These are wide-bottomed tires that don't sink into soft sand. Tires that can carry a terrific load.

Sixty-four big B. F. Goodrich tires, each weighing 220 pounds, were mounted on the trailer — eight rows of tires, eight in each row. The trailer was more than 39 feet long, nearly 17 feet wide, and weighed 73 tons. It was built to carry a total load of 300 tons — the heaviest load ever hauled on pneumatic tires.

Army tanks pushed and pulled the loaded trailer from the railroad siding to the desert. The load arrived safely and on schedule. Twelve thousand dollars' worth of tires, still usable but made primarily for this one trip that may have shortened the war.

This example of B. F. Goodrich ability to meet an unusual transportation problem is typical of the research and development carried on constantly by the company. Research which means better tires for trucks, cars, airplanes, farm vehicles, and industrial equipment. *The B. F. Goodrich Co., Akron, O.*

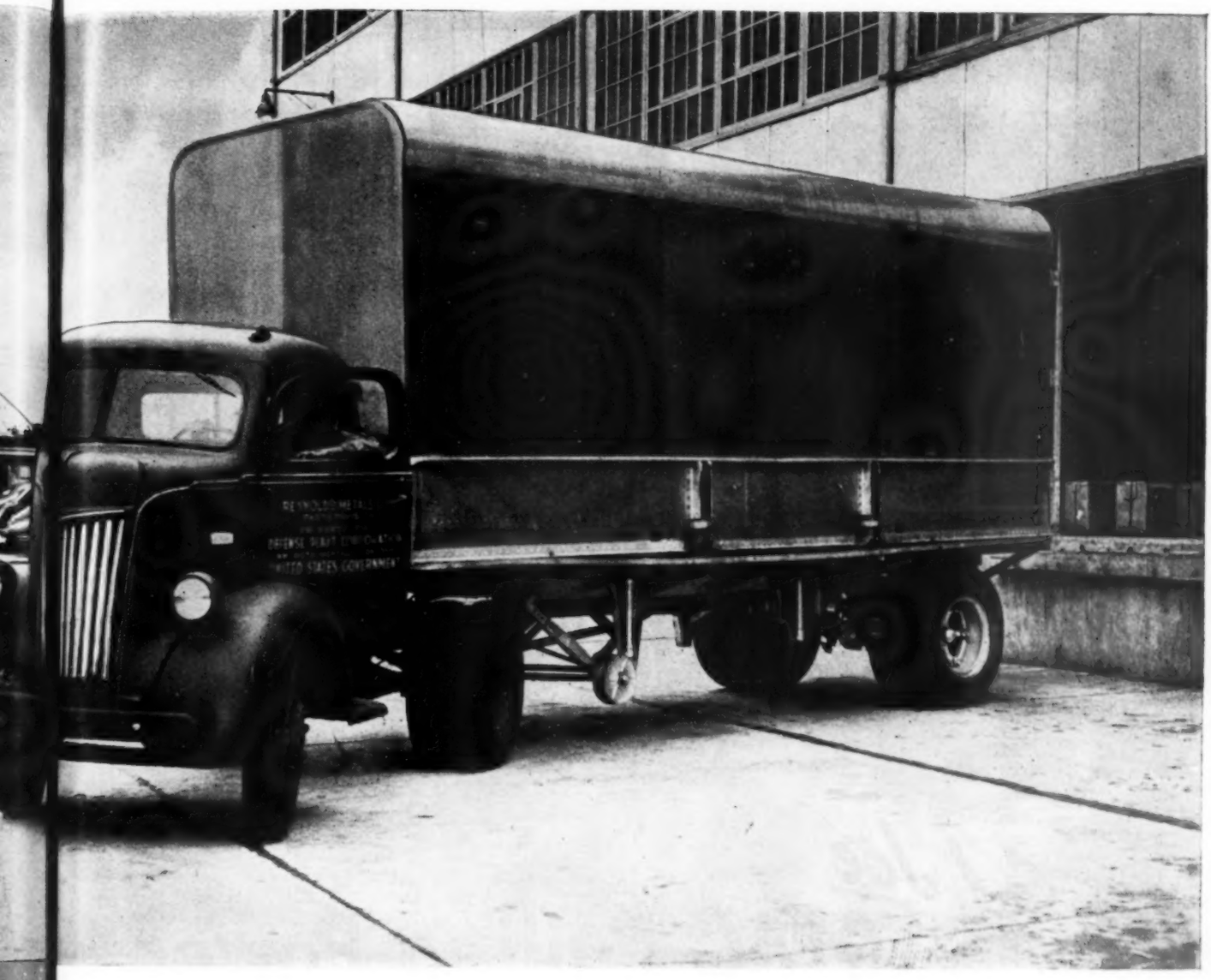
Truck Tires BY

B. F. Goodrich

FLEET OWNER, February, 1946. Vol. 36, No. 2. Published monthly by the Ferguson Publishing Co., 90 West St., New York 6, N. Y. Subscription price $3.00 per year in the United States and Canada. Single copies 35¢. Acceptance under the act of June 5th, 1934, authorized April 24th, 1941.

TEXACO

TUNE IN THE TEXACO STAR THEATRE WITH JAMES MELTON SUNDAY NIGHTS



You can eliminate the most frequent causes of high maintenance costs by lubricating your engines — heavy-duty gasoline or high-speed Diesel—with *Texaco D-303 Motor Oil.* It keeps rings free and valves active, prevents scuffing and greatly reduces wear . . . thus assures greater power, less fuel consumption, longer service life between overhauls.

D-303 Motor Oil is both *detergent* and *dispersive.* It keeps engine parts clean and holds deposit-forming materials in suspension until drained. Its quality is always uniform.

To make rear-end and transmission gears run more quietly, last longer — use Texaco transmission and differential lubricants.

For Texaco Products and Engineering Service, call the nearest of the more than 2300 Texaco distributing plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

Lubricants and Fuels

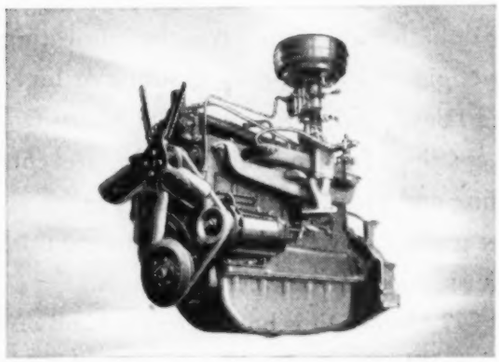
FOR THE TRUCKING INDUSTRY

METROPOLITAN OPERA BROADCASTS SATURDAY AFTERNOONS

Ask G.I. Joe about GMC Pulling Power

On every battle front G.I. Joe saw proof of GMC's pulling power. In the South Pacific, in temperatures as high as 130 degrees, GMC "six-by-sixes" hauled huge loads through hub-deep mud and sand. In Europe, GMCs played the leading role on the famous Red Ball Express. In Alaska's ice and snow, Burma's jungles and Italy's mountain trails... wherever heavy loads were pulled through heavy going... GMCs did the job.

G.I. Joe knows about GMC pulling power... and what he can tell you is mightily important to truck buyers. For GMC commercial models, ½ to 20 tons, have engines of the same basic design as their military brothers. They offer the civilian counterpart of the power, performance and stamina demonstrated by nearly 600,000 GMC "Army Workhorses."



The famous "270" engine, power plant of the "Army's Workhorse," also powers GMC models in the 3-ton range. All other GMC gasoline engines are of the same basic, war-proved design.

THE TRUCK OF VALUE — GMC TRUCKS — GASOLINE • DIESEL

GMC TRUCK & COACH DIVISION • GENERAL MOTORS CORPORATION

MORE MILEAGE IN TODAY'S MILLER RAYON TRUCK TIRES

through the use of

ELECTRONICS

The rayon cord used in today's Miller heavy service truck tires is first **electronically treated.** This amazing new scientific invention takes the kink and curl out of rayon—permits its adaptation, for the first time, to a weftless cord type of construction.

Now Miller builds rayon truck tires without heat-generating, cross-woven cords. The cords in Millers lie flat and parallel—completely surrounded by rubber. You get a cooler-running, longer-running truck tire with far greater protection against blowouts.

MILLER

RUBBER COMPANY

A Division of The B. F. Goodrich Co.

AKRON, OHIO — LOS ANGELES, CALIF.

"HEAVY SERVICE" TRUCK TIRES

Barrett Says:

WHY BLAME THE BRAKE LINING?

Chances are, your problems are purely mechanical. The Brake Dokter locates and corrects your brake troubles. Precision fitting of brake shoes to drums makes any brake job better and last longer.

More stops per reline!

MAKE US PROVE IT!

Our Service Representatives Are Everywhere

The Brake Dokter centralizes shoes, grinds to give 100% drum contact, and adjusts for proper clearance any size brake assembly from 7 to 24 inches.

BARRETT EQUIPMENT CO.

The World's Finest Brake Service Equipment

TWENTY-FIRST AND CASS • ST. LOUIS 6, MO.

Here's why most Truck Fleets specify Champion Spark Plugs

THEY'RE DEPENDABLE!

When most of the country's leading truck fleets —to whom spark plugs are a cold matter of cost per ton mile — specify dependable Champions, you have substantial proof that Champions will insure maximum economy and peak performance in your engines. Champion Spark Plug Company, Toledo 1, Ohio.

FOLLOW THE EXPERTS . DEMAND DEPENDABLE CHAMPIONS FOR YOUR CAR

The Care and Cleaning of *Automobile, Bus and Truck* Bodies

How Long would that delicate network of cutaneous surface we call the skin last if we bathed in caustic soda or uninhibited acids? We all know the answer to that. But look around and see how many service shops choose their truck and bus body-washing material without thought to resulting disintegration of the automotive "skin" . . . the painted, lacquered or enameled color finish!

Play Safe with Seventy! Oakite Composition No. 70 does a thorough, efficient body-washing job removing dirt, grease and tenacious traffic film without affecting the vitality of the body finish. Regular use of this safe, free-rinsing Oakite material produces brighter, more attractive-looking equipment, extends the life of the finish.

Special Tip: Do rust streaks around chrome hinges and mouldings of white-body trucks make a stubborn fight to survive the ordinary car washing? After regular washing with Oakite Composition No. 70 in recommended solution . . . hose rinse. Then scour rust streaks and stains with small amount of dry Oakite Compound No. 84 on wet surfaces, follow with quick rinse. This safe, effective combination does a complete job.

Free Details on a host of service-shop cleaning and related operations that can be performed faster, at lower-cost are available in 36-page Oakite Automotive Handbook. Write TODAY for your copy.

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Technical Service Representatives Conveniently Located in All Principal Cities of the United States and Canada

OAKITE *Specialized* **CLEANING**

MATERIALS · METHODS · SERVICE · FOR EVERY CLEANING REQUIREMENT

FLEET OWNER

Charter CCA Member

Vol. 36 NEW YORK, FEBRUARY, 1946 NO. 2

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★

PUBLISHED MONTHLY IN THE INTERESTS OF AUTOMOTIVE FLEET OWNERS WHO DO ALL OR PART OF THEIR OWN SERVICE WORK, AND DEVOTED TO THE BETTER OPERATION AND MAINTENANCE OF TRUCK, BUS, TAXICAB, CAR AND ALL AUTOMOTIVE FLEETS BY

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HD motor oil facts that benefit every fleet operator

TECHNICAL BULLETIN
No. 45-1
Stanolube HD
The meaning of HD in a superior type motor oil for heavy duty service
STANDARD OIL COMPANY (INDIANA) SERVICE
SALES TECHNICAL SERVICE DEPARTMENT
STANDARD OIL COMPANY (INDIANA)
CHICAGO

HERE are some of the questions that are answered and facts of interest to fleet operators covered in the 40-page, illustrated booklet shown above.

- What is a truly HD (heavy-duty) oil?
- How are HD qualities in oil measured such as: detergency, oxidation stability, and corrosion resistance?
- How does Stanolube HD compare with conventional oils and other HD oils, in the elimination of varnish, engine deposits, and corrosion? (Illustrations in full color, of engine parts operated under identical test conditions, show clearly the results you can expect *in your engines.*)

The booklet also includes details of the tests which are a part of the Army Specifications 2-104 B for approval of motor oil and the most reliable basis for comparing motor oil quality today.

You can get copies of this booklet from the Standard Oil Man who calls on you, or by writing Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Ill.

STANDARD OIL COMPANY (INDIANA) STANDARD SERVICE

The Only Heat-Vented

Proved

IN BOTH KINDS OF RUBBER!

The Exclusive Seiberling Heat-Vent is the most effective method yet devised for dissipating tire-destroying internal heat *in both natural and synthetic rubber tires!* That has been proved by millions of miles of prewar, wartime and postwar driving—proved on all kinds of roads, at all speeds, and under all conditions of load. On *your* trucks, too, cooler-running Seiberling Heat-Vented Truck Tires will deliver not only more original mileage per dollar but more recaps per carcass as well.

SEIBERLING

Truck Tire

If it's a Delco...

IT'S DESIGNED FOR THE JOB

Compact, sturdy, designed to meet particular requirements . . . Delco Hydraulic Shock Absorbers are used by leading manufacturers of commercial cars, trucks, buses, trolleys and other transport vehicles. Delco Products' extensive engineering background in "heavy" applications has proved an important factor in attaining the right kind of ride for all types of equipment. We will be pleased to work with you on your problems of springing and suspension.

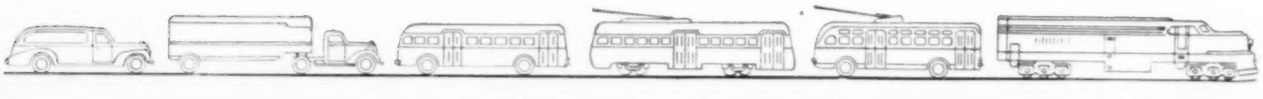
DELCO

HYDRAULIC SHOCK ABSORBERS

DELCO PRODUCTS DIVISION, GENERAL MOTORS CORPORATION
DAYTON, OHIO

UNITED SERVICE MOTORS

Delco original-equipment service parts and products are available nationally through United Motors Service distributors served by 20 United Motors warehouses.



The Sign of a good Jobber

Where you see this sign, you'll find Automotive Lighting and Safety Equipment that is—

DESIGNED RIGHT
MADE RIGHT
PRICED RIGHT
and SOLD RIGHT

Whether you need a replacement lens or complete safety lighting for a busy fleet, your K-D dealer has the product and the "know how" to assure you more miles of dependable highway-service for every dollar invested.

ASK YOUR K-D JOBBER!

THE K-D LAMP COMPANY

CINCINNATI 3, OHIO

AMERICAN BANTAM "Trade Approved" Trailers are now on the road! Built into them are all the features that trailer men told us they wanted.

We will be in mass production as soon as sufficient materials are available. So keep your eye on American Bantam for "Trade Approved" Trailers . . . coming soon!

SUPERCARGO

BANTAM

TRAILERS

ARMY (E) NAVY

AMERICAN BANTAM CAR COMPANY • BUTLER, PENNA.

WHY TAKE A DEAD BEAT

ORDINARY BATTERY
POWER-SAPPED
from being on the shelf

when you can get a LIVE WIRE?

GOODYEAR YKL BATTERY
POWER-FULL
because it's kept on constant power charge

PowR SavR keeps batteries at power-peak with a continuous trickle charge

It's a fact, new batteries are often tired even before they're ready to go to work. They're drained far short of their rated power, have fewer starts in them, just from resting on the shelf.

To be sure of a battery with its Sunday punch intact, get a Goodyear YKL — the only heavy-duty battery protected by the "PowR SavR." This automatic charger rack is a unique Goodyear feature that keeps the YKL at its power-peak until installed, gives you more sure starts to begin with.

PLUS { Cushioned Power Construction that insures longer life

Felted Fiberglas mats, placed between the YKL's plates, cushion them against jolting and jarring, provide maximum plate protection — the prime requisite for longer battery life.

So, remember these facts and make your next battery a power-*full* Goodyear YKL — for your full money's worth in starts and stamina.

YKL BATTERIES
—for buses, trucks, tractors

YKL—T.M. The Goodyear T. & R. Co.

GOODYEAR

THE GREATEST NAME IN RUBBER

BUILT FOR SERVICE

SIOUX
ELECTRIC DRILLS

Good-looking—yes, but a bear for work. Designed for greater efficiency, lighter weight, increased power and improved handling. And boy, can they take punishment.

A SIZE FOR EVERY NEED

Heavy Duty 1"—¾"—⅝"—½" (2)—⅜"—(2) $\frac{5}{16}$" —¼"—Special ¼" All Angle. Buy for service—buy SIOUX.

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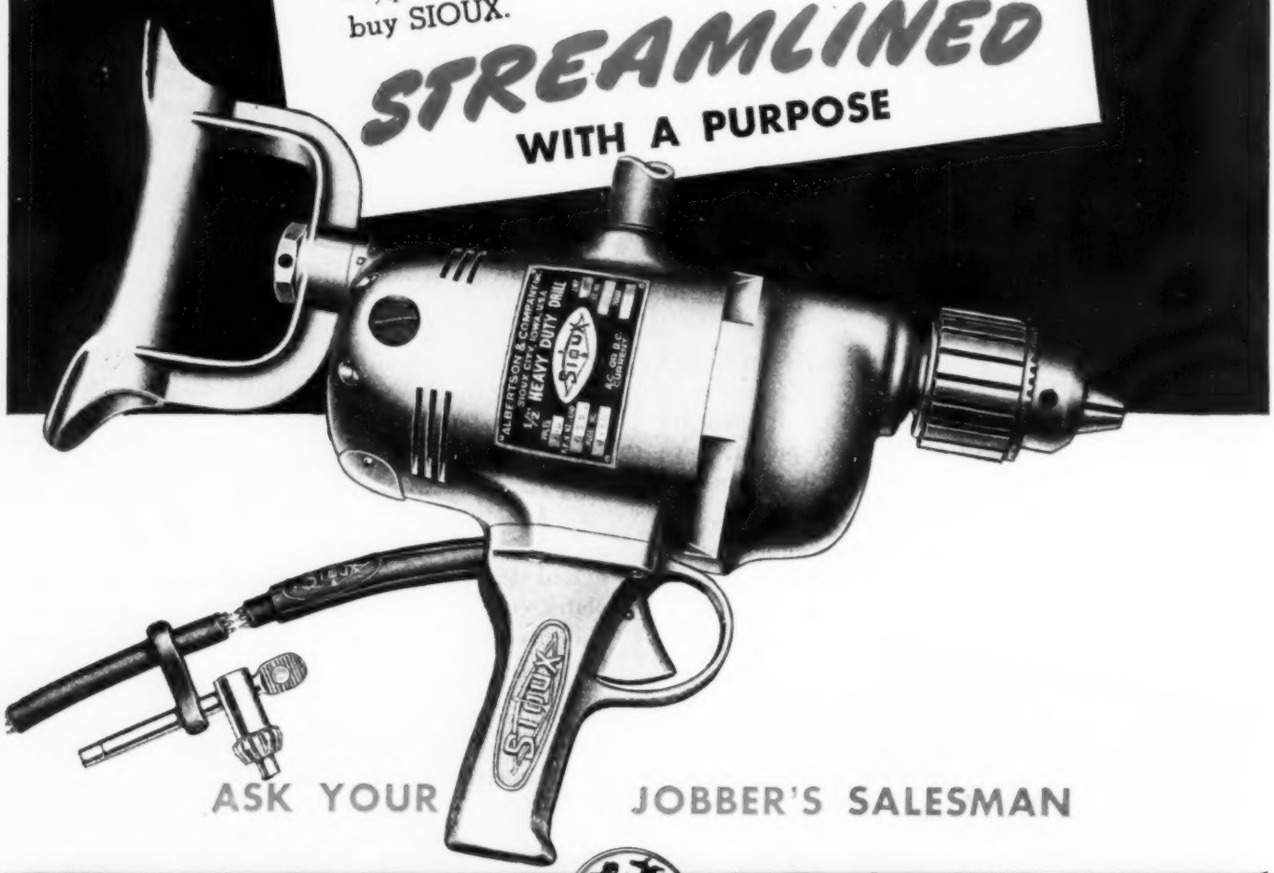
WITH A PURPOSE



ASK YOUR JOBBER'S SALESMAN

STANDARD THE WORLD OVER

ALBERTSON & CO., INC. SIOUX CITY, IOWA, U. S. A.

What you can do to **get more power** *from today's gasoline*

THE POWER'S THERE waiting for you in every gallon. To *get* that power and *use* it to lower your ton-mile costs, here's all you have to do:

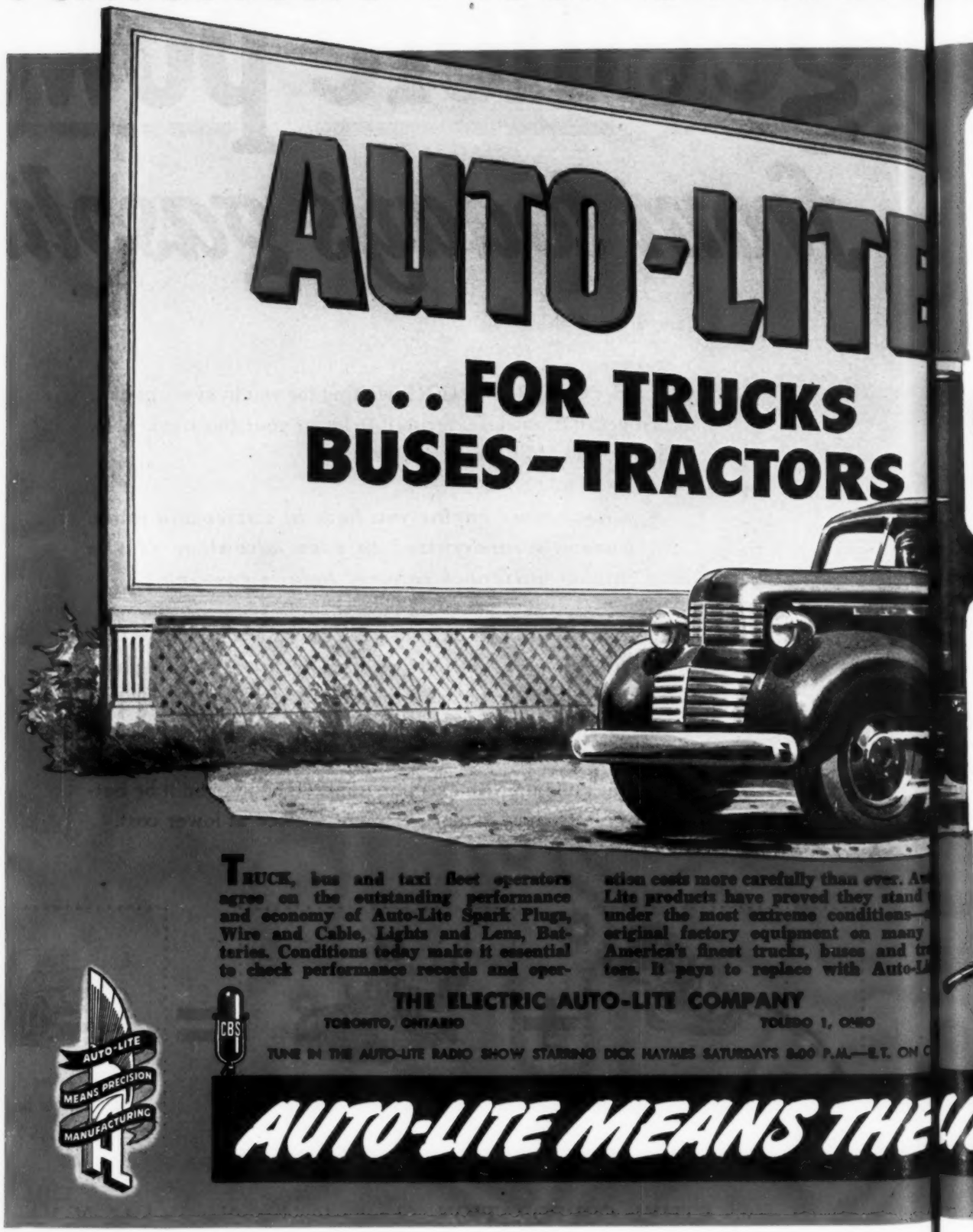
1. ***Check every engine you have in service and make sure it's modernized to take advantage of the higher antiknock value of today's gasoline.***

2. ***Keep gasoline octane ratings in mind when you buy new equipment and make sure your new engines are designed to squeeze the most power out of the fuel you use.***

If you keep up with gasoline improvements, you'll be better able to deliver more efficient service at lower cost.

ETHYL CORPORATION, *Chrysler Building, New York 17, N. Y.*

America's Fleet Owners Po



TRUCK, bus and taxi fleet operators agree on the outstanding performance and economy of Auto-Lite Spark Plugs, Wire and Cable, Lights and Lens, Batteries. Conditions today make it essential to check performance records and operation costs more carefully than ever. Au Lite products have proved they stand under the most extreme conditions— original factory equipment on many America's finest trucks, buses and tr tors. It pays to replace with Auto-L

THE ELECTRIC AUTO-LITE COMPANY
TORONTO, ONTARIO TOLEDO 1, OHIO

TUNE IN THE AUTO-LITE RADIO SHOW STARRING DICK HAYMES SATURDAYS 8:00 P.M.—E.T. ON C

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...Prove it Again AND Again!

AUTO-LITE HEAVY DUTY SPARK PLUGS

Coast to coast fleet owners have proved the value and economy obtained by using top grade spark plugs, built especially for heavy-duty bus and truck operation. The result is that more fleets are switching to Auto-Lite Heavy-Duty Spark Plugs than ever before.

AUTO-LITE HEAVY DUTY BATTERIES

For quick starts, long life, dependable power and low cost operation put Auto-Lite Heavy Duty Batteries on the job in your fleet. The complete line, now available, includes batteries with the famous Auto-Lite Fiber-glas construction.

AUTO-LITE WIRE and CABLE

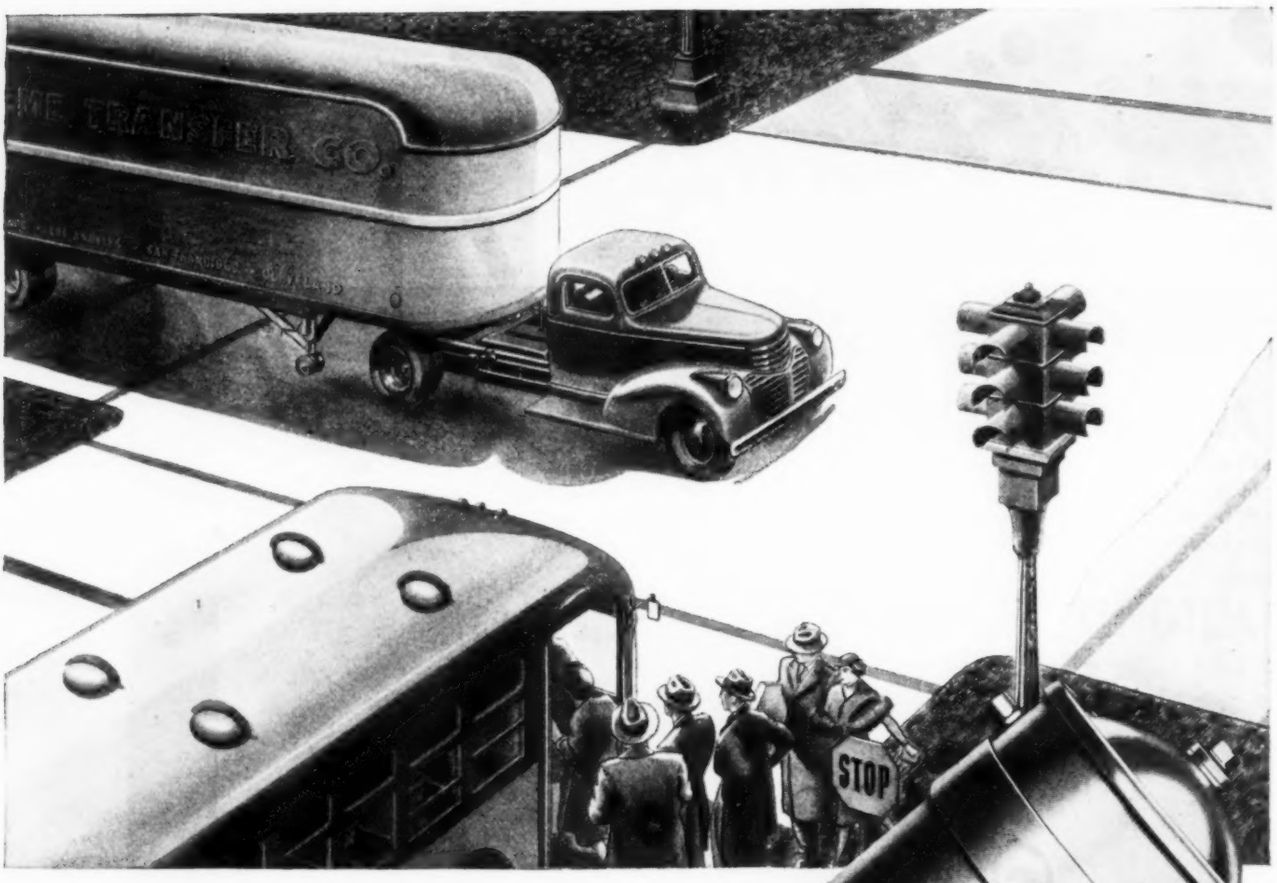
Now you can get the proven advantages of Auto-Lite Steelductor spark plug wire. Your supplier has it in stock right now. Used on the majority of American fighting planes, Steelductor has been proven, too, by trucks and buses operating in every state in the union.

That's why we say, why be satisfied with less than the best? Steelductor is available in ready-to-install sets for many makes of cars, and on spools.

AUTO-LITE LIGHTS and LENS

Auto-Lite sealed beam units, lens, fog and driving lights are designed for cars, trucks, tractors and buses. Separate bulb construction on Auto-Lite sealed beam unit keeps the light functioning even when the lens is broken.

...LIFE-LINE OF YOUR FLEET!



DIRTY WORK
AT THE CROSSROADS

Dirty oil does its dirty work at every crossroad and on every mile of highway traveled by your trucks and buses. It clogs ring slots, makes valves stick, carries grit to moving parts, steals power, runs up repair bills.

You can stop this "highway robbery" with AC Oil Filters and Replacement Elements, saving their cost many times over, because they take the dirt out and *keep* it out.

If you already have oil filters, try the AC Replacement Elements, whose many quality features enable them to clean oil *better*. And if your engines are not equipped with oil filters, they *need* them—and AC Oil Filters will give them the maximum in engine protection.

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910 Mott Foundation Building, Flint 3, Michigan

Gentlemen: Please send at once, no charge, the AC Shop Manuals checked:

- ☐ How to Service Spark Plugs
- ☐ How to Service Spark Plug Cleaner
- ☐ HOW TO SERVICE OIL FILTERS
- ☐ How to Service Fuel Pumps
- ☐ How to Service Air Cleaners
- ☐ How to Service Speedometers
- ☐ How to Service Ammeters and other Instruments

FO-2

NAME_____

FIRM_____

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CITY_____ STATE_____

OIL FILTER SERVICE

OIL FILTERS

Super Mac* Tells Why McCreary Tires Last Longer!

*The McCreary Man

"*FOR 30 YEARS* I have been building McCreary Tires with the finest available materials. Only the highest grade rubber and premium quality cord go into McCreary Tires."

"*FOR 30 YEARS* I have been building an extra sturdy sidewall. It's one of the big reasons why McCreary Tires take more recaps per casing."

"*FOR 30 YEARS* I have specialized on strong bead construction. The McCreary bead assures a better grip, eliminates rim-cutting, means longer tire life."

"*FOR 30 YEARS* I have been inspecting McCreary Tires. McCreary quality is assured through close and careful inspection at more than 40 points in the manufacturing process."

"*FOR 30 YEARS* I have been building McCreary Tires with a non-skid, safety tread — providing protection against skidding and side-slipping."

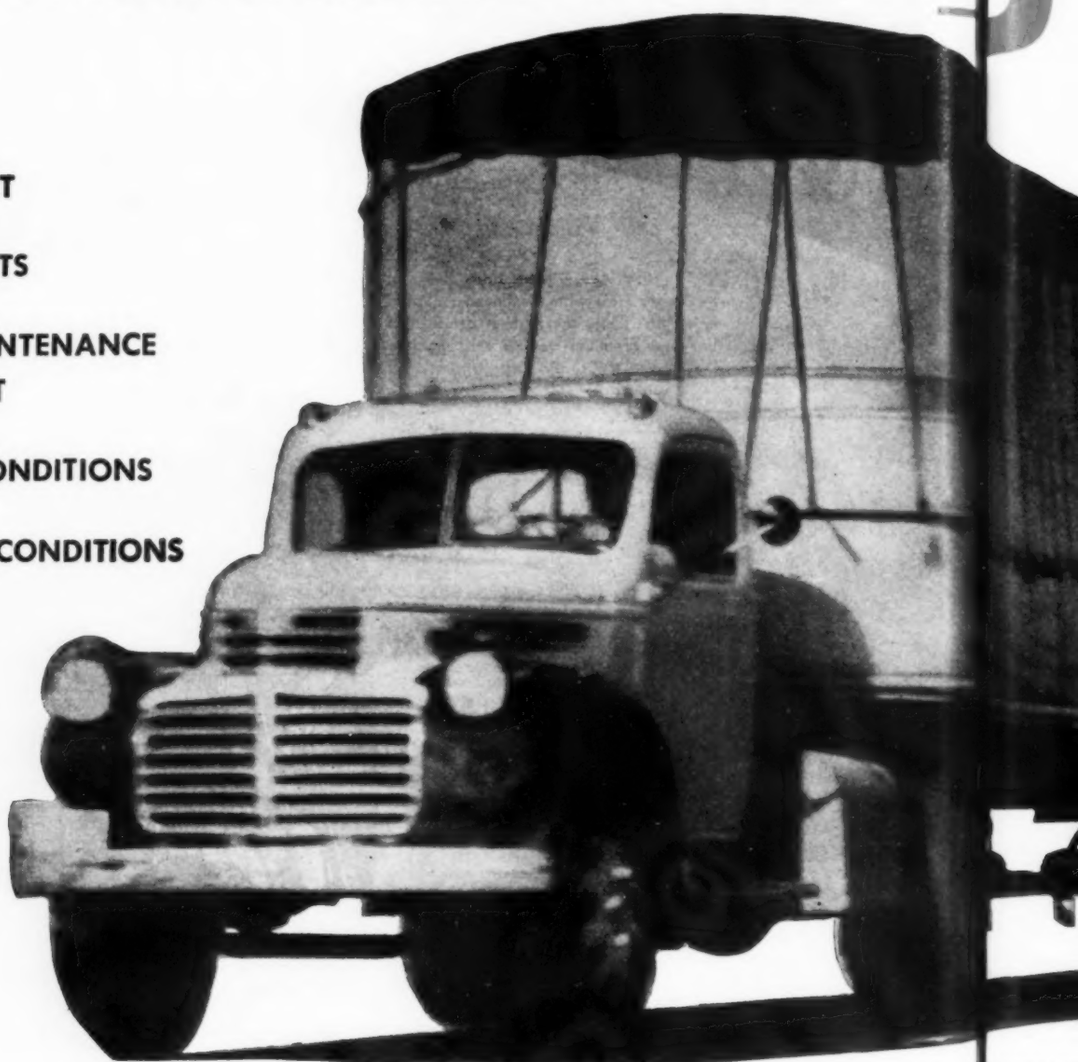
McCREARY TIRES
"Built for Longer Service"

★ Today, all tires are made of the same raw synthetic, but not all tires are alike . . . any more than when they were made from crude rubber. The new material requires entirely new compounding and fabricating techniques . . . closer attention to detail. It's the workmanship that counts! Now, as in the past, you can depend on McCreary for highest quality tires—tires that give you *more* original miles . . . *more* recaps per casing . . . and *more* miles on every recap!

McCREARY TIRE AND RUBBER COMPANY - INDIANA, PENNSYLVANIA

YES! YOUR MAINTENANCE PROBLEM IS

- SIZE OF FLEET
- TYPE OF UNITS
- SIZE OF MAINTENANCE DEPARTMENT
- WEATHER CONDITIONS
- OPERATING CONDITIONS



—AND HERE'S PERSONALIZED HELP

SOCONY-VACUUM

SOCONY-VACUUM

DIFFERENT"!

Because we realize no two fleets are alike, Socony-Vacuum Fleet Operators' Service is designed so that it can be adapted to fit your problem exactly—to meet all these varying conditions!

EVERY DETAIL of this plan is easily adapted to your specific needs, regardless of how your maintenance department is set up.

The Socony-Vacuum Representative who brings it to you is a trained lubrication man backed by tremendous resources. Here are some of the helps he offers:

1. Often he provides special instruments for "trouble-shooting."
2. When necessary, he calls in lubrication engineers to cure "problem" equipment.
3. Your men get help with shop layout to speed maintenance work.
4. You get job-tested maintenance schedules skilfully adapted to your own requirements.
5. You're sure of exactly the right oil or grease for every part of every vehicle you operate, with Socony-Vacuum's complete line of quality lubricants to draw on.
6. A system set up to assure your men of the latest technical information.

The Socony-Vacuum Representative is "on your staff but *not* on your payroll"—behind every one of his recommendations stands Socony-Vacuum's 80 years of research and experience in making oils and greases to fit specific needs. Investigate this Fleet Operators' Service today!

SOCONY-VACUUM OIL COMPANY, INC., and Affiliates: Magnolia Petroleum Company, General Petroleum Corporation of California

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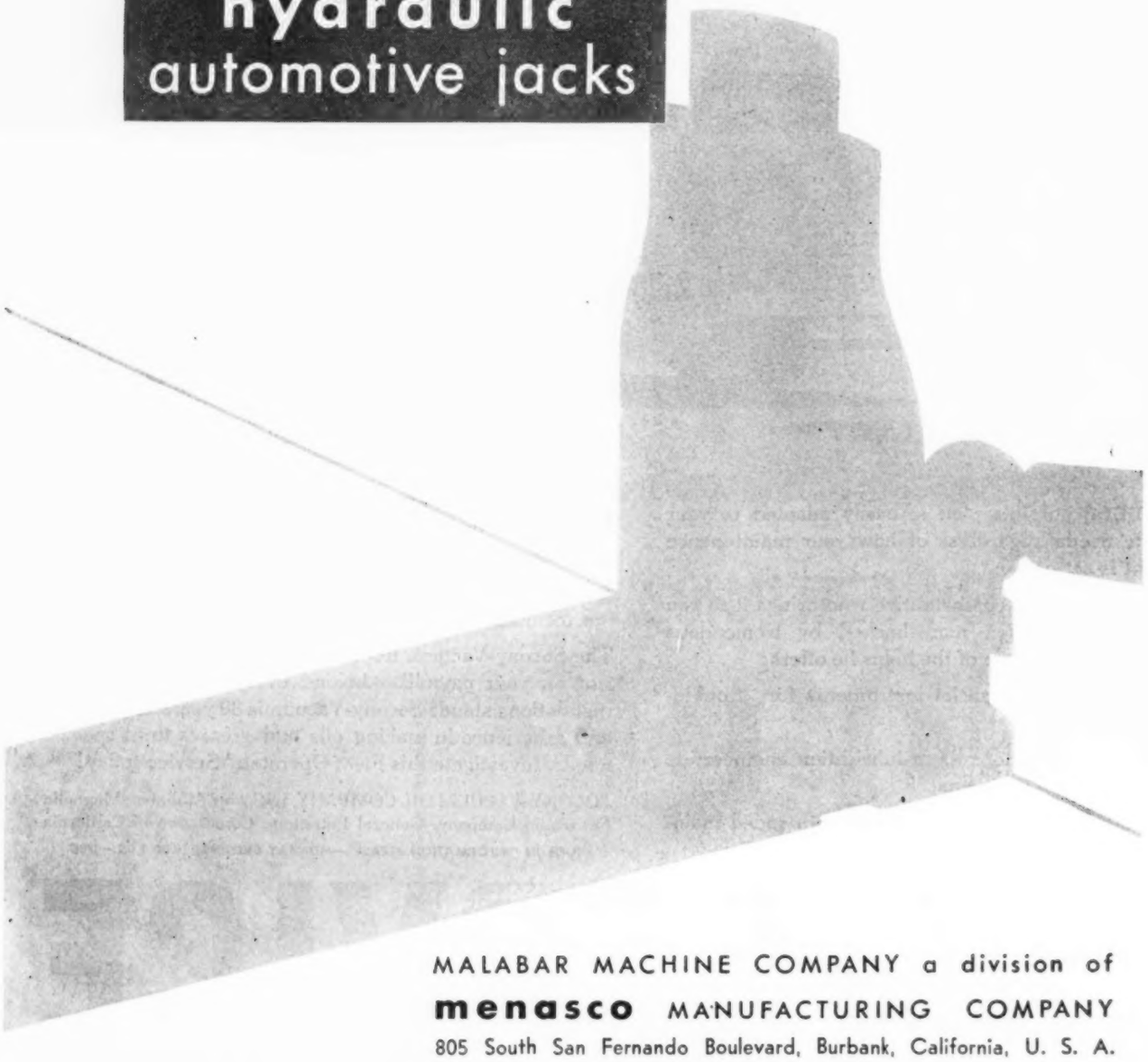
FLEET OPERATORS' SERVICE

coming!

MALABAR hydraulic automotive jacks



MALABAR MACHINE COMPANY a division of

menasco MANUFACTURING COMPANY

805 South San Fernando Boulevard, Burbank, California, U. S. A.

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SPEED WASH has a back and reservoir of steel. The handle is lightweight electric welded steel tube 5 feet long, with brush socket at one end and standard hose-connection at the other. Brush head, 11 inches wide, is detachable and replaceable at low cost. Tufts of highest quality horsehair are drawn into the block by hand with rustproof wire.

$9.45

POST PAID IF CASH ACCOMPANIES ORDER

Cut 3 Jobs Down To 1 With Speed Wash Fountain Brush

The old way of washing trucks requires three separate operations. Soaking! Scrubbing! Rinsing! Now, all three of these jobs can be done in one, with a Speed Wash fountain brush. The Speed Wash, you see, has a steady stream of clean, fresh water flowing through the handle and the brush itself. Thus each stroke loosens the dirt and carries it away. Actual experience of thousands of truck fleet operators proves that the Speed Wash cuts work and time just about in half and does a better job of cleaning besides. It's guaranteed to do the same for you. Order it today on the basis of complete satisfaction or your money refunded in full. Send check or your money order to Milwaukee Dustless Brush Co.

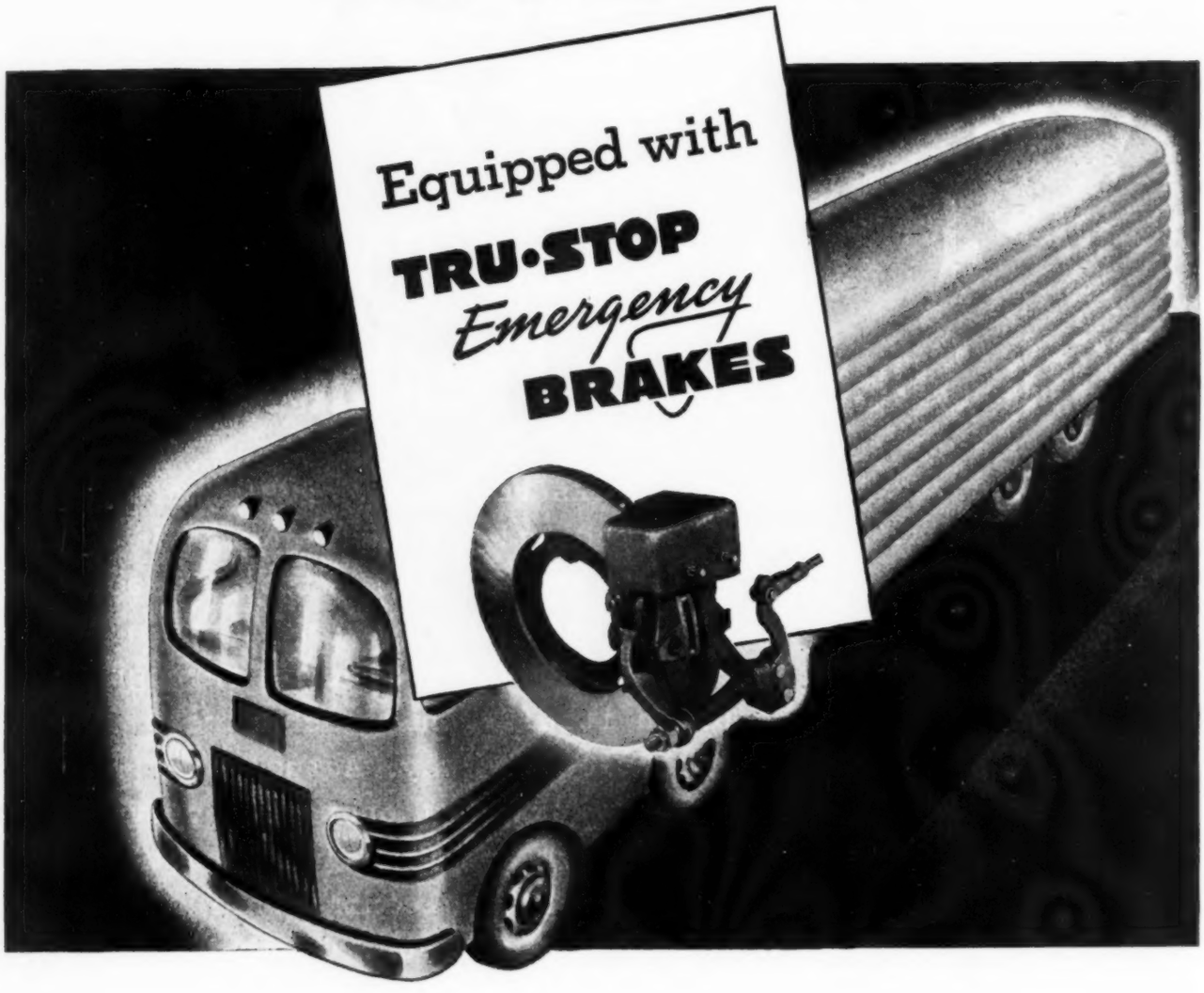
MD

"Dustless"—"Speed Sweep"—"Speed Wash" Brushes

MILWAUKEE DUSTLESS BRUSH COMPANY

530 North 22nd Street • Milwaukee 3, Wisconsin

This is a Better Truck TWO WAYS



Because of Tru-Stop Brakes, this is a safer truck. And for the same reason, it is more economical. Tru-Stop Emergency Brakes are engineered to give more safe, sure stops. And they're designed so that adjusting and relining are simple, inexpensive jobs. Tru-Stops are standard on many trucks—optional on others. Be sure your new equipment has these better, safer, longer-lasting brakes.

ACCO

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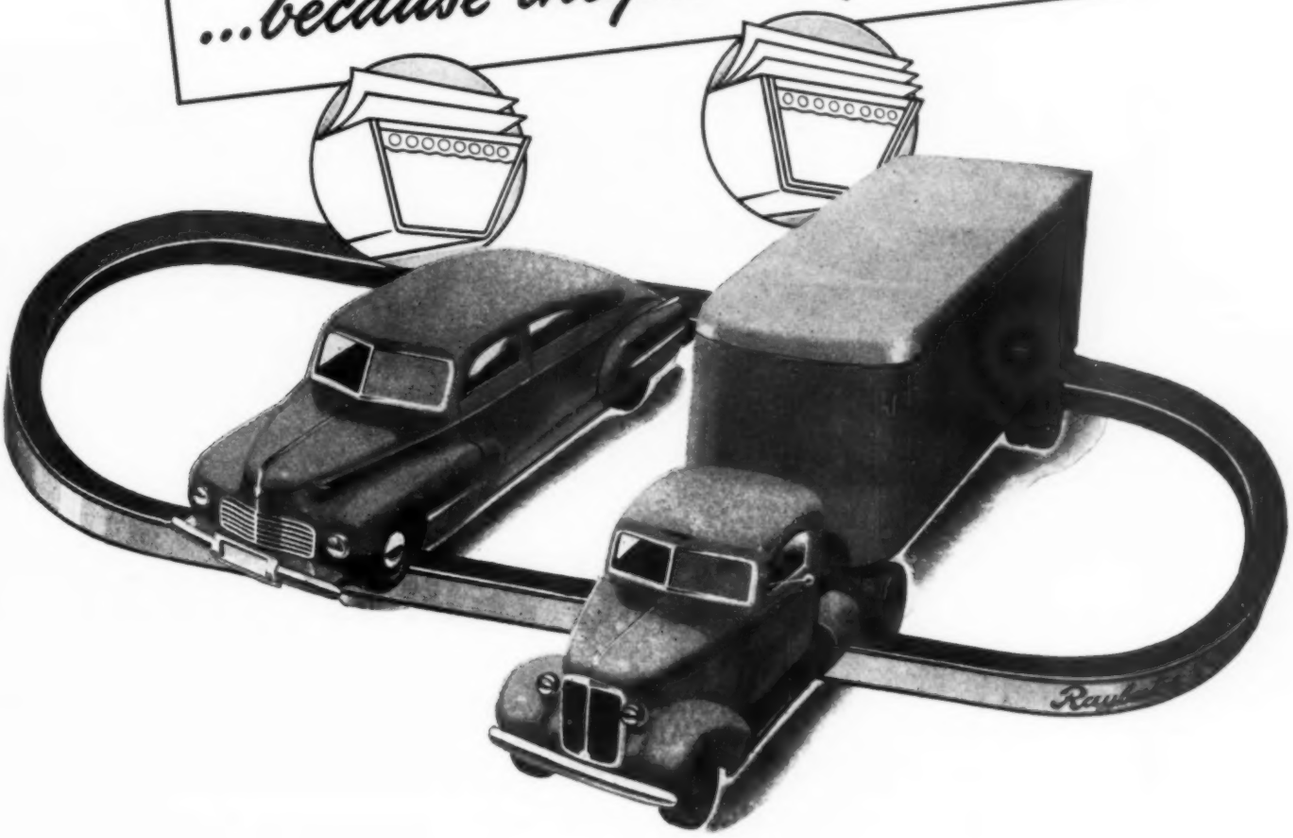
TRADE MARK

In Business for Your Safety

BETTER BELTS ...because they're Raybestos



★ Better, because like all Raybestos products, they're individually tailored to each car or truck.

A fan belt that's just right for one car—right in materials, construction, design—may be all wrong for another. Raybestos, however, gives you the right belt for every job—most of them covered with a stock of only 41. And, because they're Raybestos belts, they're easy to sell. Your customers know and trust Raybestos—the biggest name in automotive friction materials and rubber products.

THE RAYBESTOS DIVISION of Raybestos-Manhattan, Inc.
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Raybestos

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The "Red Ball Highway" wa

A luku of a truck maintenance lesson was given when the plunging Allied armies in France outran their supply lines.

With a 300-mile high-speed haul from the supply ships, vital material went to the waiting front at a truck-a-minute rate on ceaseless, turnabout runs. That route, famed as the "Red Ball Highway," was tough on drivers—*brutal* on trucks. Men could be replaced—but not motors.

What helped those overworked engines stand the gaff? *It was oil of an entirely new type*—oil that not only lubricated superbly, but held down sludge and gum, that dispersed soot and lacquer, that forestalle bearing corrosion.

Now YOUR trucks can have that identi cal type of oil. For Veedol 90 H.D. also i *detergent, dispersive, and anti-corrosiv* What's more, it has the added advantage of being made from 100% Pennsylvani crudes, assuring the utmost in therm stability with resultant less engine wea

Try Veedol 90 H.D. in your trucks f new efficiency and lower maintenan costs, for less overhaul time and more p miles. Veedol 90 H.D. comes in S.A.E. to 50. Write or wire for details.

VEEDOL 90 HEAVY DUTY IS:

DETERGENT. Keeps engines clean by minimizing sludge and gum formations, keeps piston rings and valves free.

DISPERSIVE. Its dispersive action keeps gum and sludge as well as particles of soot in suspension—all of it is actually drained off with the oil.

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Send for the Veedol P.M. Plan, too!

The Veedol Preventive Maintenance Plan, successful with over 800 fleets, can help yours. The Plan fits any number of units—costs only 18¢ per truck. Ask about it!

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Preferred by leading fleet men, Palm Brothers truck decals are inexpensive, easy to apply, and require no pencil varnishing. They keep their brilliance regardless of operating conditions.

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For your convenience we have offices in all principal cities.

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CINCINNATI..12...OHIO..U.S.A.

. . . Built to do more than expected!
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We don't recommend that a jack be overloaded—but, if and when an emergency makes it necessary—there is satisfaction in knowing that a H-W Jack has been factory-tested at 1½ times its rated capacity.
These super-powerful, easy-operating, absolutely dependable hydraulic jacks are made in models of 3, 5, 8, 12, 20, 30 and 50 tons capacity . . . For details, ask your jobber, or write us.
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FOR DURABILITY THAT MEANS ECONOMY IN UNIFORMS — *DEMAND*

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** Residual shrinkage less than 1%*

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Low repairs in tough oil field hauling *prove* DIAMOND T *reliability*

THIS oil well location is so bad that it's good for motor trucks. It's a Louisiana swamp, so deep that a foundation and plank road had to be built. It is the exception—most oil field hauling is heavy for loads and brutal for roads.

In this grueling service, E. J. Duplantis, prominent oil equipment hauler of Houma, La. reports: "After two hundred thousand miles my Diamond T had been so economical on repair that I was glad to buy three more. These have now done some 40,000 miles each in five months with no repairs." Good experience, but not unusual, because Diamond T has always built for "heavy-duty."

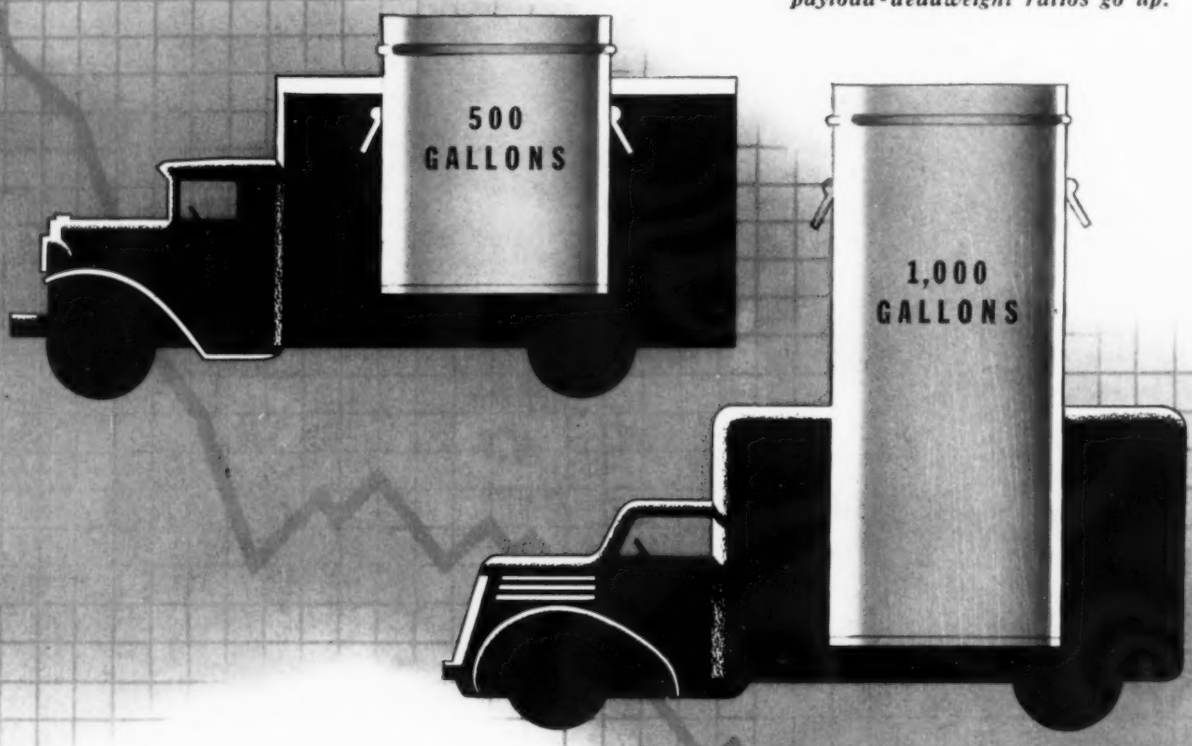
Diamond T research and pioneering continue. New and improved Diamond T commercial trucks are already in volume production for all types of service. *See your Diamond T dealer!*

DIAMOND T MOTOR CAR COMPANY, CHICAGO

Established 1905

DIAMOND T TRUCKS

Hauling costs go down rapidly as payload-deadweight ratios go up.



Here's Progress!

5-TON TRUCK=500 GALLONS
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Today, a 1½-ton truck can refrigerate and deliver twice as much ice cream as could once be delivered by a 5-ton truck. That's what comes of lightening heavy-duty trucks and their refrigerating equipment with Alcoa Aluminum.

Such progress called for close cooperation between truck designers, refrigeration engineers and Alcoa metallurgists.

Alcoa does not design or build trucks or refrigeration equipment. Our role is assisting manufacturers in using Alcoa Aluminum to solve their problems—problems involving weight saving, corrosion resistance, heat transfer, and the like. Ask your supplier about aluminum equipment. ALUMINUM COMPANY OF AMERICA, 1974 Gulf Building, Pittsburgh 19, Pennsylvania.

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Please mention FLEET OWNER *when writing to advertisers.*

LIKE OLD MAN RIVER

They just keep rolling along!

Kelly is *the trucker's tire!* Built in one of the most modern tire plants—up to the minute in materials, methods, design—it has something extra the trucking industry likes . . .

Ruggedness and dependability that reflect 52 years of tire craftsmanship!

Fleet records bear this out—show Kellys "keep on rolling" long after other tires are through.

Try the new Kelly. Test it against others if you like. It's completely redesigned to run cooler, with a new tread contour that relaxes rubber instead of stretching it. But *most important*, it has Kelly character, Kelly quality. It will "take it" and "take it" and come back for more!

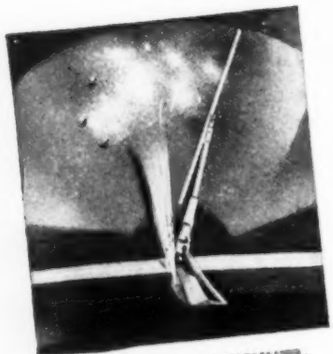
THE KELLY-SPRINGFIELD TIRE CO.
Cumberland, Maryland

Fleet Records show "Kellys are Tough."

KELLY QUALITY COSTS LESS PER MILE!

KELLY *Springfield* **TIRES**

In a split second this blinded windshield will be *WASHED*



Operates by vacuum.
Easily installed.

● When thaws muddy the streets and highways, clouds of dirty, grimy spray continually torment the man behind the windshield.

On trucks and buses equipped with Trico's Automatic Windshield Washer, the simple touch of a button eliminates this serious hazard.

Two jets of clean water, or special Trico solvent, squirt onto the glass and the wipers instantly produce a crystal clear windshield.

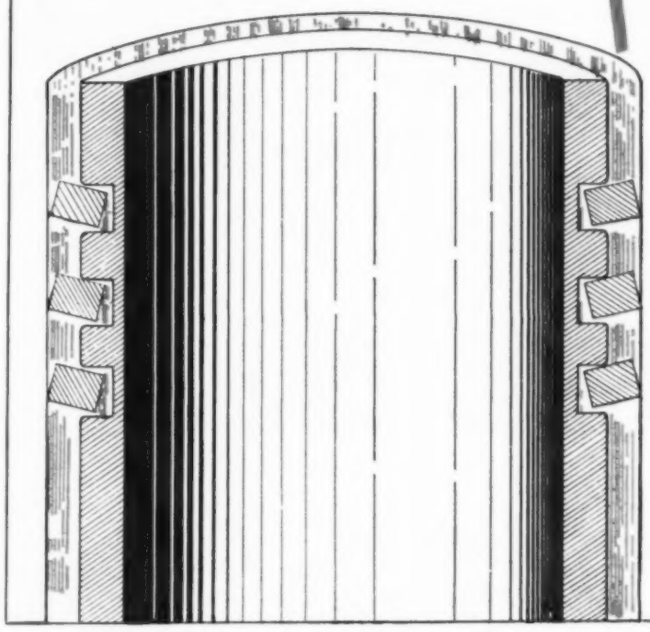
Save driving strain, save property, save *lives* by installing this inexpensive safety "first." Every truck, every bus *needs* it.

TRICO

Windshield Washer

TRICO PRODUCTS CORPORATION, BUFFALO 3, NEW YORK

Diesel Engine DANGER points



"ROCKING" PISTON RINGS SCORE LINERS

"Rocking" piston rings, the result of excessive wear in the ring grooves of Diesel engine pistons, are the source of considerable lay-off time and expense to Diesel operators—Wear-enlarged grooves permit rings to rock, and "bite" into cylinder walls. The result is usually a costly overhaul to replace not only pistons, but worn liners as well. It's a danger point in many Diesels—but "rocking" rings and their cause, enlarged ring grooves, can be minimized.

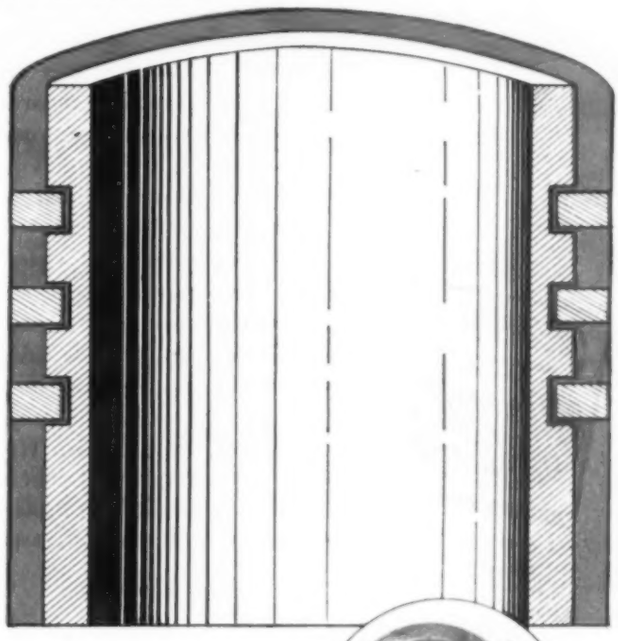
RPM DELO Oil clings to hot engine areas often left exposed to wear by ordinary uncompounded oils.

RING GROOVE WEAR REDUCED BY RPM DELO OIL

In a series of 1000-hour laboratory tests, Standard scientists proved that ring groove wear can be minimized with RPM DELO Diesel Engine Lubricating Oil.

Piston ring groove wear in an engine operated on a top quality straight mineral oil was thirty times that experienced with RPM DELO Oil in an identical test.

RPM DELO Oil reduces wear due to a metal-adhesion additive which makes it cling to and lubricate hot engine areas other oils often leave bare, and to other compounds which eliminate stuck rings and engine deposits, prevent bearing corrosion, stop oil foaming.



To match the fine performance of RPM DELO Oil use these equally efficient companion products from the same famous "RPM" line—

RPM HEAVY DUTY MOTOR OIL
RPM COMPOUNDED MOTOR OIL
RPM GEAR OILS & LUBRICANTS
RPM GREASES

For additional technical information write Dept. T-X, Standard of California, San Francisco 20, California, or California Commercial Company, 30 Rockefeller Plaza, New York 20, N. Y.

STANDARD OF CALIFORNIA

The Hinges of Hell Could Get No Better Heat Treatment ...

to give you Mechanics Hand Tools that make money

A red line appears on the chart of an instrument . . . a tempering furnace at New Britain is under automatic control! That red line records the fact that we are heat treating some Hand Tools exactly right for you . . . right to the precise degree of heat — right to the split second of time — and, right to make the finest alloy steel TOUGH!

You know it takes certain alloys and careful machining to make good Hand Tools. But, it also takes exact heat treating to develop the highest ultimate strength of the steel. Here, on two counts, New Britain Hand Tools are outstanding. First, because the steel that goes into New Britain made Tools is carefully selected, inspected, etched, tested and examined inside and out. Second, because heat treating at New Britain is an exact science—controlled, as is every major operation in this huge plant, down to the last degree and second.

The entire Line of New Britain Hand Tools is a natural for YOU. These famous Tools have won their reputation for toughness and the ability to "take it" the hard way—IN SERVICE! Ask your jobber's salesmen to show you these money-making TOOLS. When you've handled one, you'll want them all — they're that good! The New Britain Machine Co., New Britain, Conn.

The complete New Britain Line for Automotive, Aircraft, General Maintenance & Production Needs is sold by leading Jobbers.

New Britain

The Army-Navy "E" Pennant, with stars, flies over New Britain's plants, signalling outstanding production of machine tools, aircraft engine parts and projectiles.

GREATER STRENGTH · BETTER FIT HAND TOOLS

You were wrong
THE TIME YOU FELL ASLEEP ON THE CREEPER
DON'T LOOK NOW BUT HERE COMES THE BOSS. WE SHOULD HAVE WAKED UP JOE
SLEEPING BEAUTY WILL GET WAKED UP, ALL RIGHT- AND NOT BY PRINCE CHARMING, EITHER

...but you're right WITH PACKARD CABLE

You're not "asleep at the switch" when you replace worn-out or inefficient spark plug wires with Packard Four-Forty ignition cable. Packard Four-Forty is *right* . . . for *any* kind of car, truck or bus, and for *all* kinds of driving conditions.

Special materials, special manufacturing methods and an especially tough protective sheath are the reasons for Packard Four-Forty's exceptional resistance to heat, cold, oil, moisture and corona. It protects engine performance regardless of temperature or humidity.

Poor cable can cause plenty of trouble in an otherwise perfect ignition system. That's why so many fleet operators insist on Packard Four-Forty ignition cable for replacement. Be sure you do, too. You'll get utmost ignition efficiency and more miles per replacement.

CERTIFIED RE-WIRING

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PACKARD ELECTRIC DIVISION
GENERAL MOTORS CORPORATION
WARREN, OHIO

FOREMOST BUILDER OF AUTOMOTIVE AND AVIATION WIRING

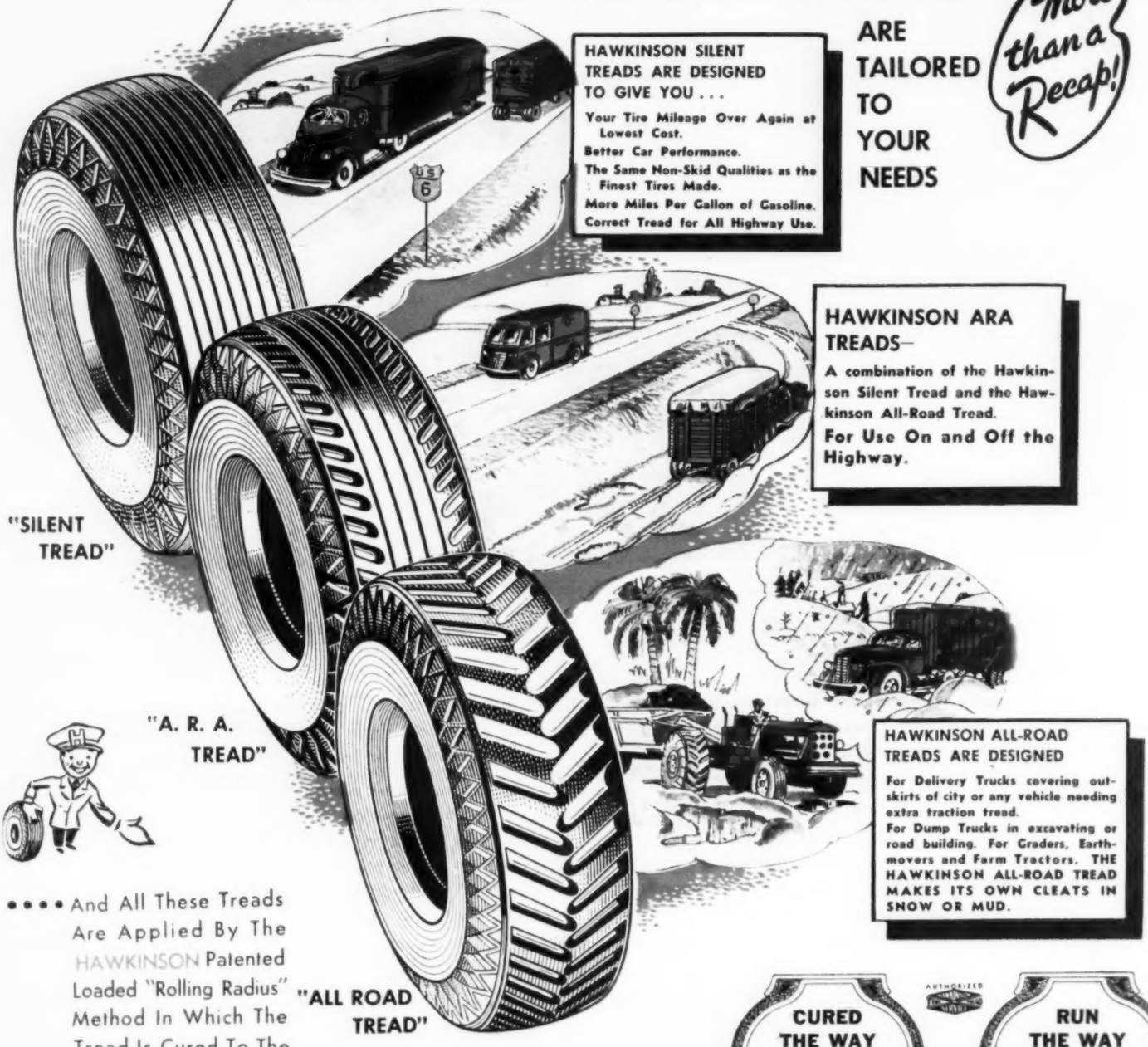
Designed for All Driving Conditions—

SINCE 1931

HAWKINSON TREADS

More than a Recap!

ARE TAILORED TO YOUR NEEDS



HAWKINSON SILENT TREADS ARE DESIGNED TO GIVE YOU . . .

- Your Tire Mileage Over Again at Lowest Cost.
- Better Car Performance.
- The Same Non-Skid Qualities as the Finest Tires Made.
- More Miles Per Gallon of Gasoline.
- Correct Tread for All Highway Use.

HAWKINSON ARA TREADS—

A combination of the Hawkinson Silent Tread and the Hawkinson All-Road Tread.

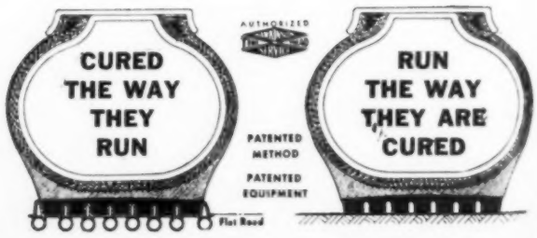
For Use On and Off the Highway.

HAWKINSON ALL-ROAD TREADS ARE DESIGNED

For Delivery Trucks covering outskirts of city or any vehicle needing extra traction tread.

For Dump Trucks in excavating or road building. For Graders, Earthmovers and Farm Tractors. THE HAWKINSON ALL-ROAD TREAD MAKES ITS OWN CLEATS IN SNOW OR MUD.

•••• And All These Treads Are Applied By The HAWKINSON Patented Loaded "Rolling Radius" Method In Which The Tread Is Cured To The Casing While The Casing Is Contracted To The Position Assumed Under Load On The Road. You Ride On Neutral Rubber . . . .



RUN COOLER • LAST LONGER • STEER EASIER

Authorized **HAWKINSON TREAD** *Service*

In Principal Cities U. S. A., Canada and Foreign Countries

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Nothing Else Like It...

FOR FREQUENT-STOP DELIVERY SERVICE

...IT'S CONVENIENT...ECONOMICAL...ATTRACTIVE

• Marmon-Herrington's unique new DELIVR-ALL for the first time brings to the commercial world a vehicle embodying all the long-awaited features essential to fast, efficient, economical house-to-house and store-to-store delivery service.

Here is a front-drive vehicle with wide, full-length, close-to-the-ground floor (for easy entrance and exit)—large capacity—low center of gravity of load—stand-up or sit-down operation—short wheelbase maneuverability—independent and detachable front-end power and drive unit (for preventive maintenance)—and many other convenience and performance features.

Into DELIVR-ALL has gone all of the design and engineering genius of Marmon-Herrington, world-renowned builders of *All-Wheel-Drive* trucks. DELIVR-ALL is the result of years of research and exhaustive in-service tests—a truly tried and proved vehicle—ready to speed deliveries—reduce costs—increase profits . . . for you!

Orders are now being accepted for DELIVR-ALLS. Write, wire, phone or visit us for complete information and delivery dates on this most modern of delivery vehicles.

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Lower Maintenance Cost

WITH THE PISTON TRUCK & BUS ENGINEERS *Recommend*

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THE 1946 BUICK

Spicer-Equipped!

The new 1946 Buick is equipped with Spicer Universal Joints

BUICK—always a great name on the road—has for many years been served in its power delivery needs by Spicer universal joints. Even in war, Spicer units helped give Buick-built combat vehicles a famous name for fast, hard-hitting action. The new 1946 passenger car models are the best Buicks yet—helped in this attainment by the best Spicer equipment yet! No matter what your automotive power transmission needs may be, Spicer has the engineering and manufacturing skill to serve you.

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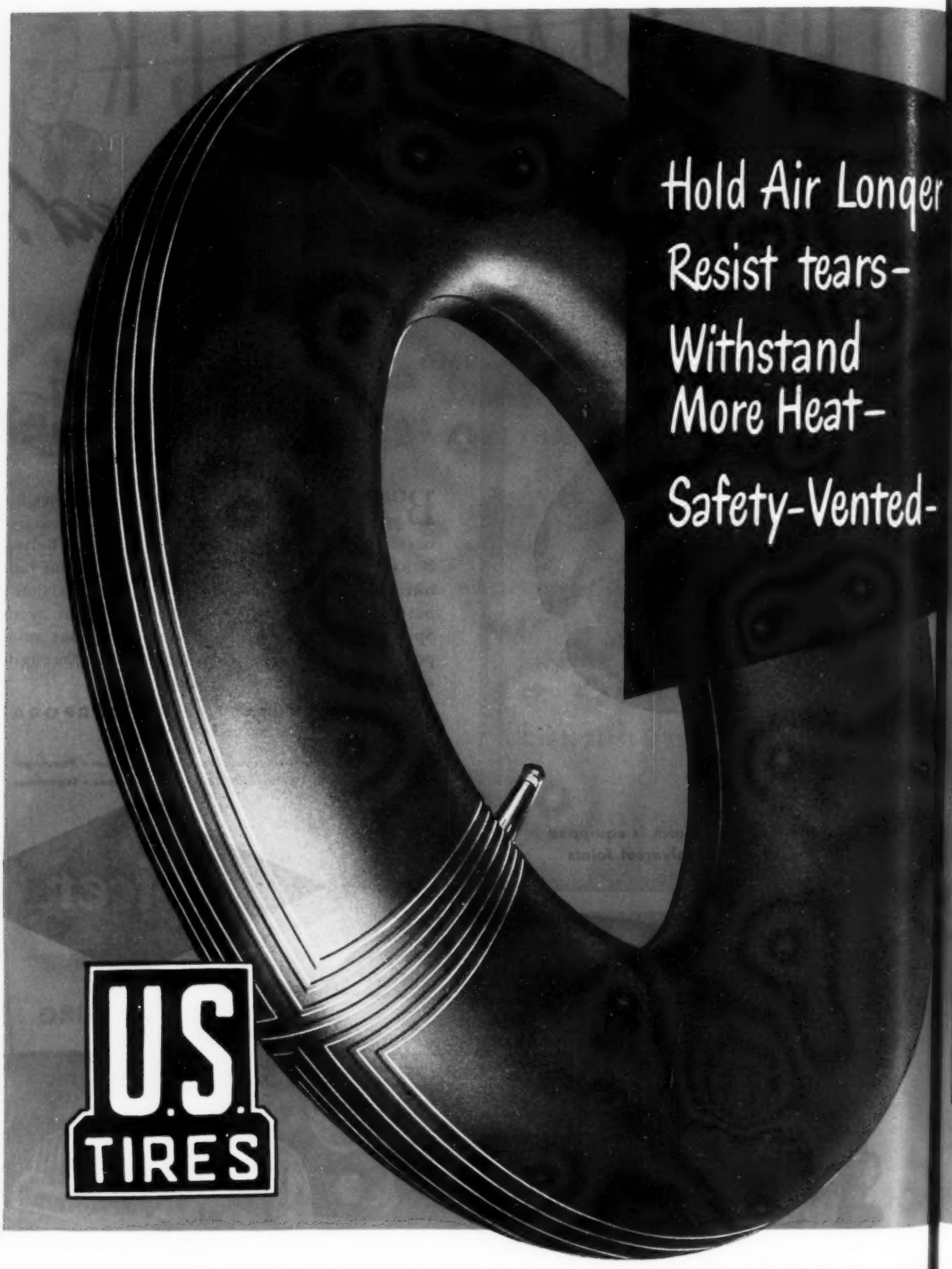
Transmissions • Torque Converters • Clutches • Passenger Car Axles • Universal Joints • Parish Frames • Stampings

42 YEARS OF Spicer SERVICE



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U.S. ROYAL BUTYL TUBES

The experience of truckers from coast to coast—the results of grueling tests in "U.S." laboratories—show new U.S. Royal Butyl Tubes far and away better than natural rubber in air retention, heat, tear and age resistance, and in consistent serviceability. Because the danger of under-inflation is minimized, new U. S. Royal Butyl Tubes increase tire life—add extra miles of trouble-free service at lower cost per tire mile.

HOLD AIR LONGER

U.S. Royal Butyl Tubes retain air far longer than tubes made of natural rubber. Inflation is more constant between pressure checks.

RESIST TEARS

U. S. Royal Butyl Tubes have higher tear resistance. Toughness of compound reduces splitting, tearing—makes repair easier.

WITHSTAND MORE HEAT

U. S. Royal Butyl Tubes have superior heat resistance. They minimize roadside delays on long, fast trucking runs.

SAFETY-VENTED

Exclusive "U.S." Safety-Venting allows release of air trapped between casing and tube, reduces danger of sidewall separation.

SPECIFY U. S. ROYAL BUTYL TUBES FOR LOWER COST PER TIRE MILE!

Phone Your U. S. Truck Tire Distributor Today!

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WARNER

MORE AND MORE LEADING TRAILER FLEETS ARE SWITCHING TO **WARNER** "DREADNAUGHT" ELECTRICAL CONNECTIONS

WHY put up with troublesome, danger-breeding, flimsy connections? — when the heavy-duty WARNER "Dreadnaught" completely solves all your electrical contact problems for the life of the vehicles! So ruggedly made it lasts indefinitely — first cost is last cost. Weather-proof — fully protected — can't freeze and snap off due to sleet or icing-up from road splashings. Impervious to rain and mud. Can't break or pull-out accidentally to "blackout" trailer lights to invite fines and rear-end collisions. The fact that all mechanized vehicles bought during the war for U. S. and other Allied Forces were standard equipped with Warner Sockets demonstrates that their design, construction and efficient, trouble-free performance merited the high regard of designing engineers and procurement staffs.

Don't struggle through this winter, or winters to come, with flimsy electrical connections — get set for permanent, trouble-free service by installing WARNER "Dreadnaught" Coupling-Cable Kits on all your tractor-trailer combinations.

Immediate Deliveries

Through Leading Truck and Trailer Dealers and Automotive Jobbers

Get WARNER "Dreadnaught" Coupling-Cable Kits through the dealer from whom you bought your trucks or trailers — or your nearest automotive jobber. If he is out of them — write direct to us.

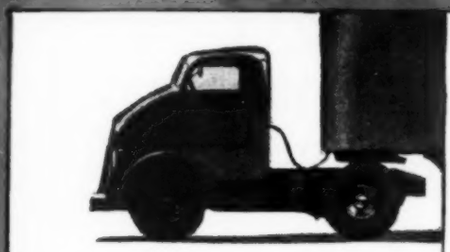
"Dreadnaught" ELECTRICAL CONNECTION COUPLING-CABLE KIT for ALL Tractor-Trailer Combinations

Rugged, Permanent, Weather-Proof Installation Assures Trouble-Free Service for Running Lights, Stop Signals, Turn Signals, Parking Lights — All Electrical Contacts FOR LIFE OF THE VEHICLES.

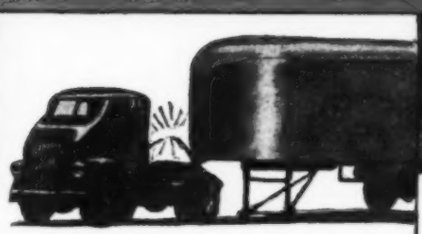
THIS COMPLETE KIT EASILY INSTALLED!

The WARNER "Dreadnaught" Kit includes 2 ruggedly constructed, weather-proof Coupling Sockets. (1 each for cab and trailer). Heavy-Duty Coupling-Cable with wires and rugged connector units for all electrical requirements molded in extra heavy, flexible rubber "hose," as easy to plug in or out as a radio — Cable Supporting Spring and Clamp — complete with Mounting Bolts, Nuts and Washers for quick, easy installation.

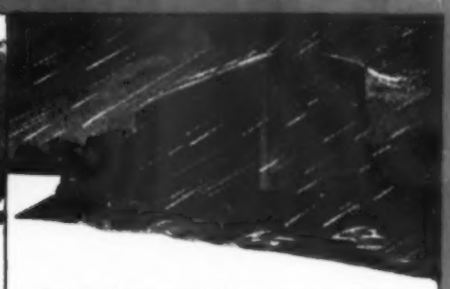
SOLVES THESE PROBLEMS



Flimsy, ordinary connections fray or break under severe road and weather conditions.



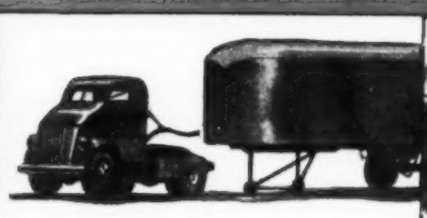
No snapping off by a "pull-away".



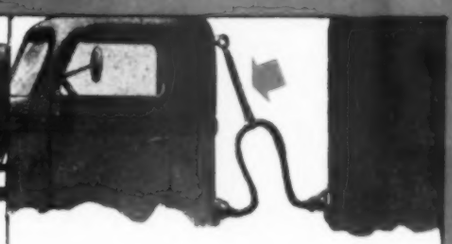
Trailer "blackouts" bring fines, delays, and accidents!

PROVIDES THESE ADVANTAGES

— Ruggedly constructed, weather-proof WARNER "Dreadnaughts" stand up under severest road and weather conditions.



If driver fails to disconnect on drive-away, rugged cable pulls connector out of trailer socket — cover springs shut to prevent corrosion.



Heavy Cable Support Spring prevents cable from dropping in mud, water or sand.

A Product of **WARNER ELECTRIC BRAKE MFG. CO., Beloit, Wisconsin**

MADE STRONG
To Stand Recapping

The main reason truck and bus owners get maximum service from Mohawk Tires is that the carcass of a Mohawk Tire is made extra strong to stand recapping. Unless seriously injured, it is good for at least two new treads, sometimes more.

Fleet owners report they get the service of two extra tires for only two-thirds the price of one by having their Mohawk Tires recapped twice with Mohawk Special Truck Tire Capping Stock.

Mohawks Go Farther

THE MOHAWK RUBBER COMPANY
AKRON 5, OHIO

KEEP OIL FREE FROM ABRASIVES WITH

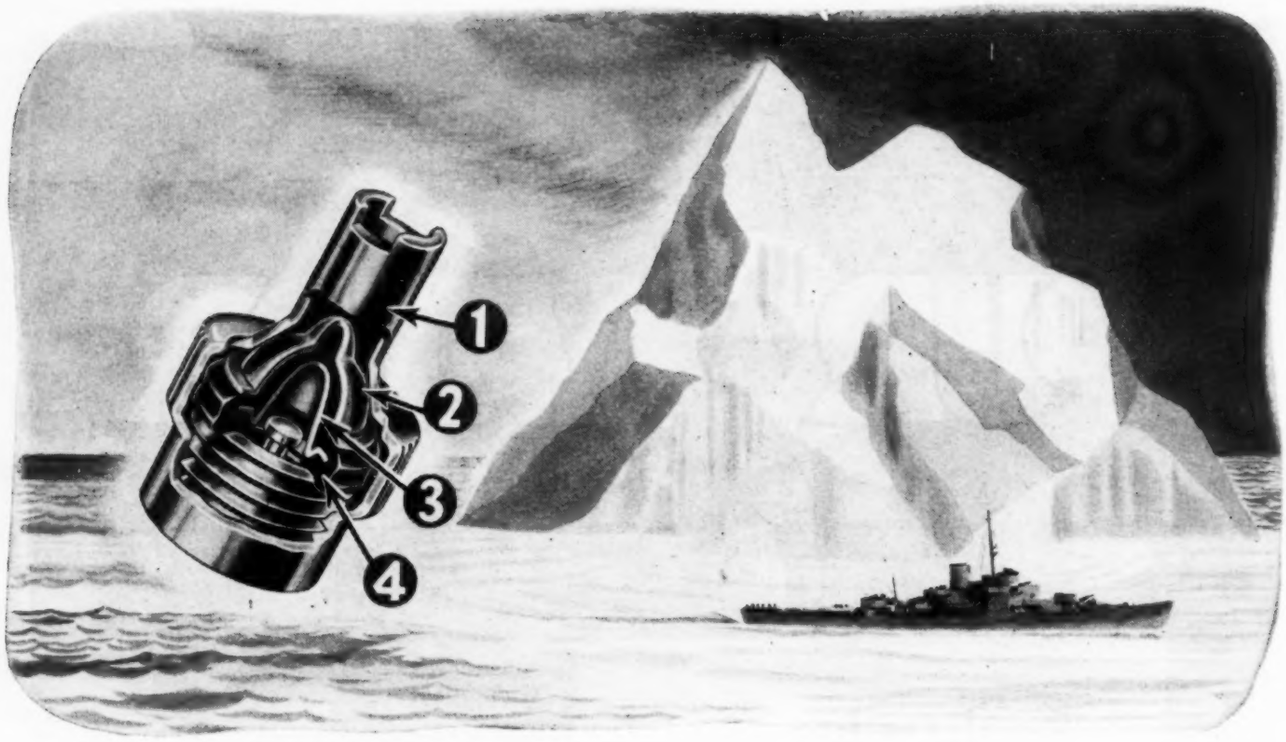
PUROLATOR

THE OIL FILTER

Purolator has in this filter the greatest development in the history of the oil filter industry

WATCH
APRIL
FLEET OWNER

PUROLATOR PRODUCTS INC.
NEWARK 2, N. J.
Founder and Leader of the
Oil Filter Industry



SEAL WINTER OUT

WINTER is tough on tires and unprotected valves. Schrader Caps help protect them by keeping slush, water and snow from entering the valve and freezing inside. They make a positive seal that *keeps air in—dirt and water out.*

Standard Schrader Caps with their 1-2-3-4 piece construction are rugged. They *seal winter out* and help prevent underinflation which breaks down sidewalls and ruins tires.

MAKE YOUR TIRES LAST LONGER

Check your air pressure daily with an accurate Schrader gauge. Inflate to proper pressure and *seal* the air in at the valve mouth with a Schrader air-tight Cap. It's not how much air you put in a tire, it's what stays in that counts!

Check your stock of Schrader Products and order your needs now.

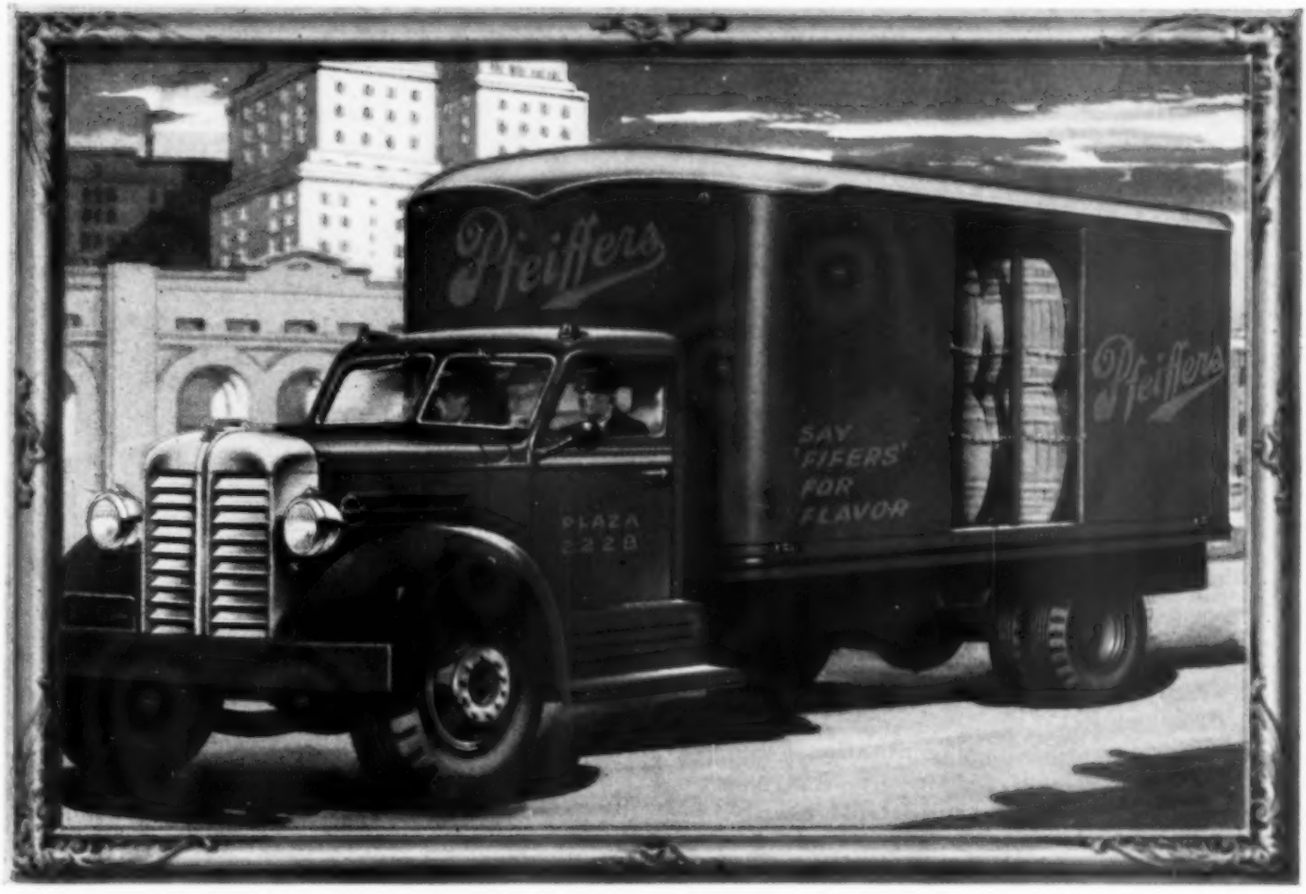
This Seals the Air!

Schrader Caps are again available

Schrader
CONTROLS THE AIR

AIR-TIGHT CAPS are vital for TIRE CONSERVATION

A. SCHRADER'S SON, ***Division of Scovill Manufacturing Company, Incorporated,*** **BROOKLYN 17, NEW YORK**



FEDERALS HAVE WON

By Costing Less to Run!

● Heavier wear and tear on motor trucks throughout the war years . . . the urgent need to handle more—faster—helped furnish users and operators alike with a yardstick to more accurately measure performance and in-built values. Today these same men are capable of judging trucks more critically than ever before.

We like that!

Because, during that period, Federal Trucks stood up to the toughest kind of punishment and established an enviable record for efficiency, sturdy performance and all 'round lower operating costs. By consistently offering a wide range of motor trucks in varied tonnage capacities, Federal can accurately match truck to specific job needs. No matter how tough or rugged your peace time problems of truck transportation may seem, you'll find Federal units skillfully engineered and built to last for years.

Consult your Federal dealer—get the added reliability and long-lived economy from trucks built to your specific transport requirements.

Federal is proud of its war production record, having been cited four times for meritorious achievement in building trucks for the Armed Services.

FEDERAL MOTOR TRUCK CO. • DETROIT 9, MICHIGAN

FEDERAL TRUCKS

Since 1910 . . . Known in Every Country—Sold on Every Continent

There's a special reason why you need this

DOUBLE-DUTY OIL! now!

MANY FLEET operators have learned by experience that trucks and buses can go through service formerly unheard of—and be kept in good operating condition.

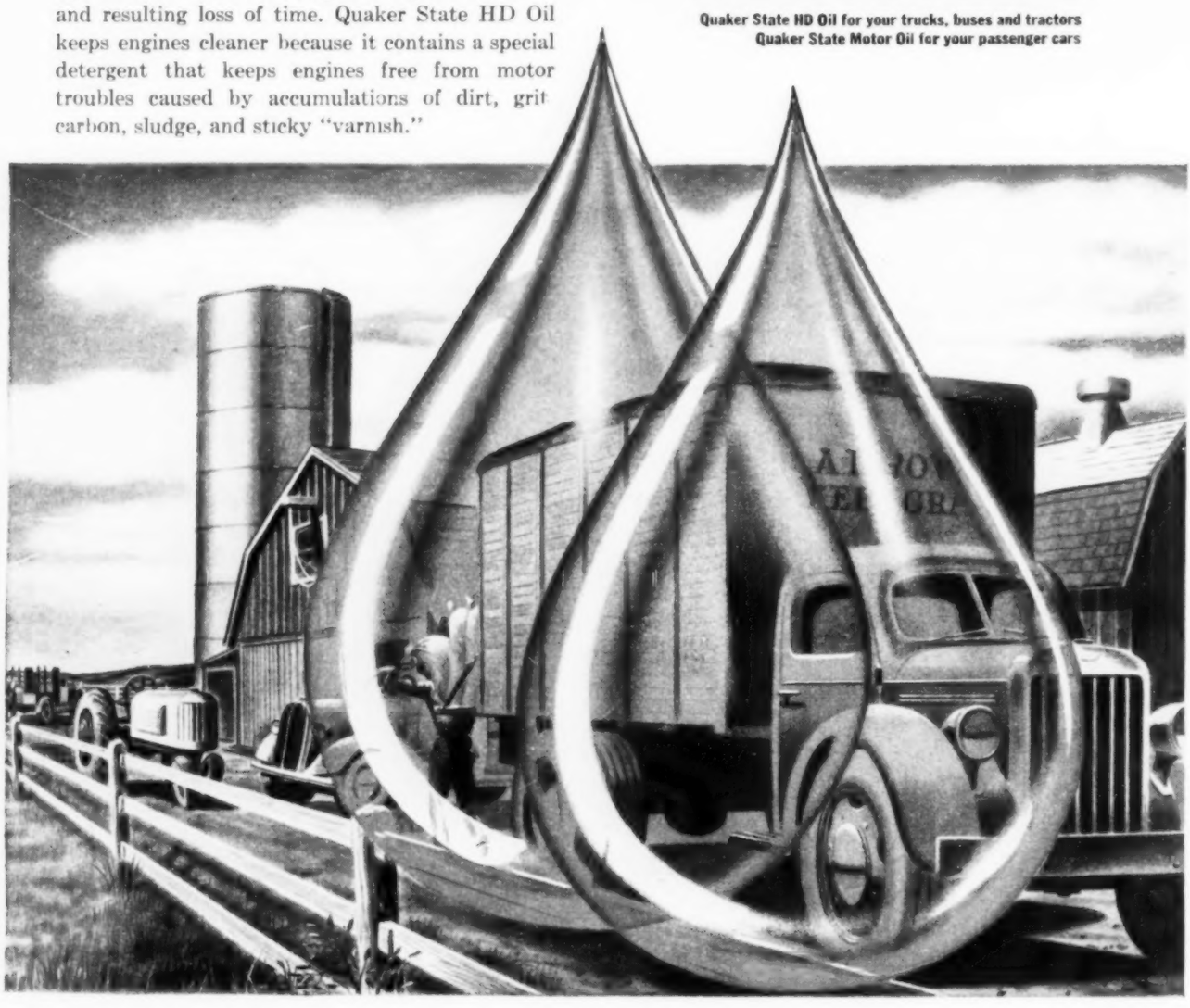
And—one of the reasons why is—Quaker State HD Oil! These men have learned that Quaker State HD Oil performs a *double-duty*. Why? 1st it *lubricates*. 2nd, it *cleans*.

Quaker State HD Oil lubricates better and lasts longer because it is made especially for tough grueling service—made to protect modern engines against heat and friction, against expensive repairs and resulting loss of time. Quaker State HD Oil keeps engines cleaner because it contains a special detergent that keeps engines free from motor troubles caused by accumulations of dirt, grit carbon, sludge, and sticky "varnish."

You need Quaker State HD Oil now—and from now on. Try it. Check the results carefully and you will use it permanently.

QUAKER STATE
HD OIL
AND QUAKER STATE SUPERFINE LUBRICANTS

Quaker State HD Oil for your trucks, buses and tractors
Quaker State Motor Oil for your passenger cars



QUAKER STATE OIL REFINING CORPORATION · OIL CITY, PENNSYLVANIA

Please mention FLEET OWNER *when writing to advertisers.*

"COOPER DSCs* SURE OPENED THE BOSS' EYES TO *EXTRA TRUCK TIRE MILEAGE"*

"Back last June, the boss figured we oughta be gettin' better tire mileage on our trucks, so we switched to Cooper DSCs.* He's all grins now. Coopers are pilin' up plenty of extra safe miles even under heaviest loads and top speeds, and savin' money. It's Cooper's special *distributed stress construction* that makes the difference."
THE COOPER CORPORATION, FINDLAY, OHIO

*DSC means *Distributed Stress Construction*—perfected by Cooper and recognized as one of the most advanced, scientific features of modern truck tire construction. Distributes tire stresses evenly throughout carcass, eliminates hinge spots, reduces heat and friction, increases mileage. Coopers are made of *heat-resisting rayon*—proved best for truck tires. Let us give you the complete facts and figures on both Cooper DSC truck tires and Cooper Armored Cord passenger tires.

Always Look For... Ask For

COOPER DSC TRUCK TIRES

Dayton Wheels

USE DAYTONS—AND AVOID REPLACEMENT!

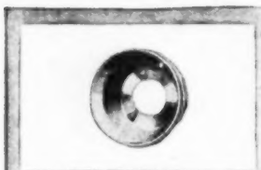
RECORDS of leading truck, bus and trailer manufacturers show that Dayton Wheels do not wear out in service. Even in event of damage caused by a wreck, Dayton Cast Steel Wheels are easily repaired by welding.

Reduction of stress on the rim through the use of a larger bolt circle—plus the greater all-over strength attained by correct design—makes Daytons the longest-lived wheels ever offered to the trucking industry. Yet Dayton Wheels are *lighter*, the demountable-rim type construction alone saving the weight of an extra wheel. Tire changing is much easier and faster.

Two Dayton Wheel features are responsible for notably greater tire life. First, the fanning action of the spokes makes Dayton Wheels run 22° to 47° cooler by actual test. Second, the increased pressure on the clamp bevel of the demountable rim prevents rim slippage and consequent uneven tire wear.

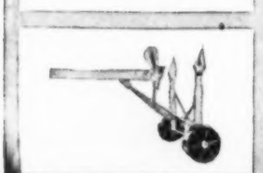
After 32 years of quality leadership, Dayton Wheels are still the best. Specify Daytons for new equipment or replacement.

THE DAYTON STEEL FOUNDRY CO., DAYTON, OHIO
40 Years In Business



★
DAYTON BRAKE DRUMS
Drums assembled to the wheels at the factory give more perfect concentricity.

★
DAYTON 5TH WHEELS
Standard equipment on many trailers. Quick coupling. Positive operation.

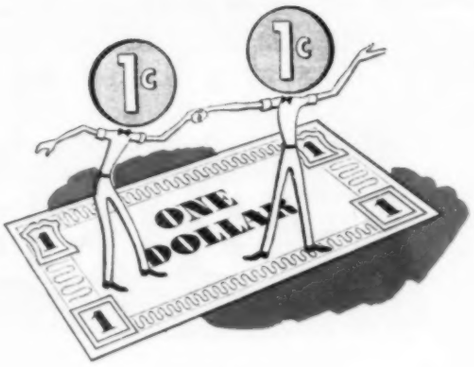


★
DAYTON LANDING GEARS
Made in both hydraulic and mechanical types.

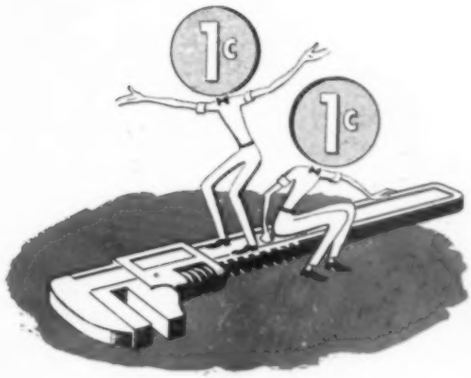
Dayton
SPOKE TYPE CAST STEEL
Wheels

Dayton Wheels are available on any of the following: *Trucks*—Autocar, Federal, International-Harvester, Gramm, Mack, Studebaker and White. *Trailers*—Fruehauf, Trailmobile, Gramm, Kingham, Edwards and Mono. *Buses*—Brill, Mack, and Pullman. Specify Dayton Wheels, Brake Drums, Fifth Wheels and Landing Gears for your own trucks, trailers, buses.

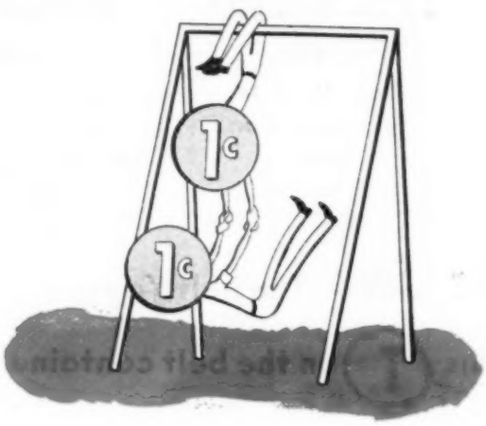
BUY WAR BONDS AND STAMPS



Oil *(even the very best oil) takes less than 2c out of every dollar of operating expense.*



Mighty two pennies! *They can definitely reduce repair bills caused by accumulation of hard carbon.* (And that includes many of the most common motor troubles.)*



They can penetrate! *Cling to vertical surfaces! Withstand the heat and pressure of high speed, heavy duty operation!**

And so give you more pay-loads per unit

...more profit from the fleet!*

***Prove it in your own equipment!** Macmillan Ring-Free motor oil IS different, unique, the only oil of its kind. Refined by an exclusive, patented process. Because it IS a better oil, we invite you to test it against any other brand in the world. We'll gladly help you arrange a dollars-and-cents test in your own equipment. Write, wire or phone the nearest Macmillan office.

MACMILLAN PETROLEUM CORPORATION • 50 W. 50th St., New York 20 624 S. Michigan Ave., Chicago 5 • 530 W. Sixth St., Los Angeles 14.

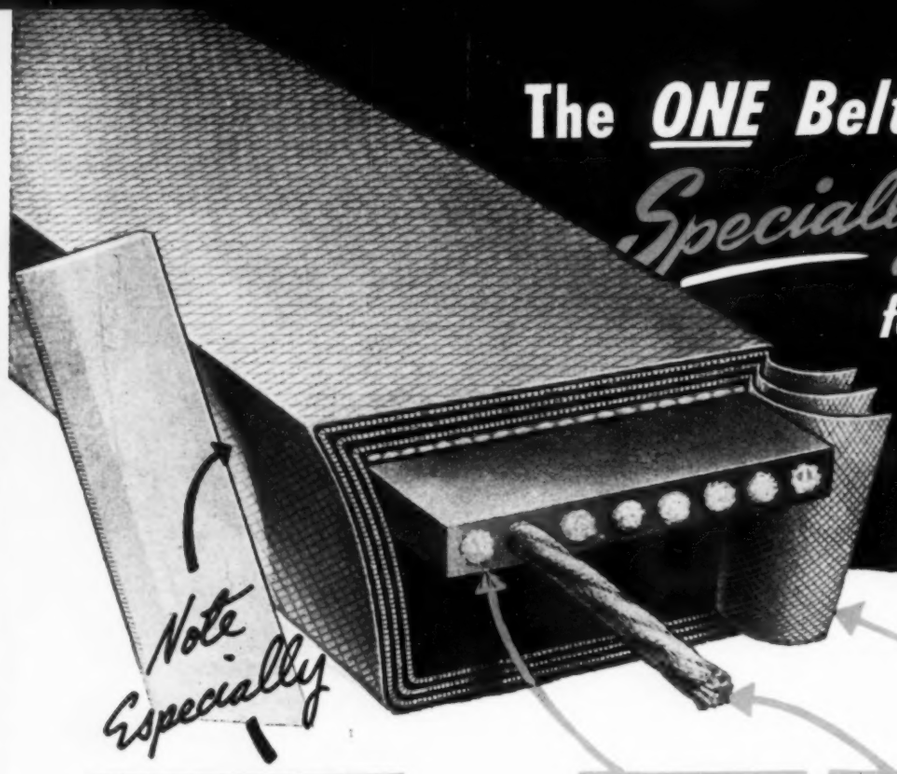
HIGH, HIGH FILM STRENGTH! LOW, LOW ENGINE DEPOSITS! LUBRICATES AS IT CLEANS!

Here it is

ASK FOR MACMILLAN OIL

THE LOW-MAINTENANCE OIL

The *ONE* Belt that is *Specially Engineered* for TRUCKS and BUSES...



The Patented
Concave Side
Like all Gates Belts, the Gates Truck Belt is built with the famous, life-prolonging Concave Side — a Gates Patent.

Special Heavy-Duty Compound

30% Stronger Cords
Than Used in Passenger Car Belts

Multiple-Ply Cover
Much Longer Wearing Than On Passenger Car Belts

Make Sure The belt You get has this (T.) on the belt container

This distinctive "T" is the Gates trade mark used ONLY on the Gates Truck Belt which has been *specially engineered* for truck and bus service. You can be assured of getting the belt designed for this more demanding service *only* by seeing to it that you are delivered belts which bear this Gates "T."

* REG. U. S. PAT. OFF.

Read What the Biggest TRUCK BELT USERS Say:

80% LONGER WEAR

CHICAGO, Ill.
"We are getting 80% longer wear than any other belt ever gave us."
All American Bus Lines.

CUTS COSTS 75%

SAN PABLO, Calif.
". . . has reduced our belt replacements about 75%."
R. A. Conyes.

80% LONGER LIFE

OMAHA, Nebr.
"Our records show 80% longer life for Gates Truck Belts."
Watson Bros. Trans. Co.

75% MORE SERVICE

SAN ANGELO, Tex.
"We're getting 75% more service than from any other belt we ever used."
Beard Machine Shop.

LONGER WEAR

ELIZABETH, N. J.
". . . much longer belt life and much less servicing."
Morey-Larue Laundry.

70% INCREASED LIFE

LEXINGTON, Ky.
"We have increased belt life about 70% with your Truck belts."
Lexington Railway System.

MANY MORE MILES

GENEVA, N. Y.
". . . many more miles of service than even pre-war belts."
Market Basket Corp.

50% LONGER SERVICE

DES MOINES, Iowa
". . . is giving about 50% longer service over even pre-war belts."
Iowa Road Building Co.

OUTLASTS ANY OTHER

SHREVEPORT, La.
". . . outlasts any other truck belt we ever used by one-third or more."
Louisiana & N. W. Trans. Co.

---That's Why Actual Records of Big Operators Show 50% TO 80% LONGER WEAR

"Use Only 1/2 As Many Belts"

Actual records of many Fleet Operators who are using Gates Truck Belts show that they are now using only ½ as many belts as they previously had to buy. Cutting belt purchases squarely in half is, of course, a very substantial saving in itself—yet this is actually only the *smallest part* of the savings enjoyed by users of Gates Truck Belts.

You Save *Even More* in Servicing Time and Other *COSTLY DELAYS!*

Every time a belt has to be replaced on a truck or bus, valuable *operating time* of that unit is *lost*. Every delay for belt servicing or belt adjustment takes its toll from the productive operation which is your only source of income. Very often, in critical instances, even slight delays can cost a lot of dollars. Is it any wonder that the belt which so greatly reduces these costs—the Gates Truck Belt—is now used exclusively by hundreds of the most successful operators of truck and bus fleets?

You Wouldn't *THINK* of Using a Passenger Car TIRE on a Truck!

Why Use a Passenger Car Belt?

You know, when you think of it, that trucks and buses put a heavier load on belts just exactly as they do on tires. A typical truck belt, for example, must carry more than 3 times the horsepower load of a passenger car belt. Trucks and buses run longer hours, change speeds more often, accelerate and decelerate more abruptly, with more stops, starts and idling in low gear.

That is why the belt that is specially engineered for truck and bus service—the Gates Truck Belt—is giving its users fully 50% to 80% longer wear in addition to other savings which, as we have noted, are of even greater importance.

When you have read the candid statements of Gates Truck Belt users printed on these pages, we believe you will want to call your jobber and tell him to send you some Gates Truck Belts TODAY!

T 4512

USE ½ AS MANY BELTS — **NEWARK, N. J.**
"Since adopting Gates Truck Belts we are using only half as many belts as before."
Bloomingdale Dairy Co., Inc.

CUTS SERVICE DELAYS — **OAKLAND, CALIF.**
"We are getting fully 75% longer wear with corresponding reduction in servicing time and belt adjustment delays."
Carnation Milk Co.

80% TO 100% BETTER — **KANSAS CITY, Mo.**
"Gates Truck Belts are doing an 80% to 100% better job for us."
Adams Transfer and Storage.

BIG CUT IN COSTS — **NEW ORLEANS, La.**
". . . plays an important part in keeping our maintenance costs down."
Yellow Cab Co.

WEARS 75% LONGER — **NASHVILLE, Tenn.**
". . . gives about 75% longer wear than any other belt we ever used."
Wilson Truck Co., Inc.

90% LONGER SERVICE — **SACRAMENTO, Calif.**
". . . gives 90% longer service than even your pre-war belt."
W. T. Smith, Shop Supt., Gibson Lines.

50% TO 60% MORE SERVICE — **JARREL, Tex.**
". . . giving 50% to 60% more service—far the best we've used."
Jarrel Motor Co.

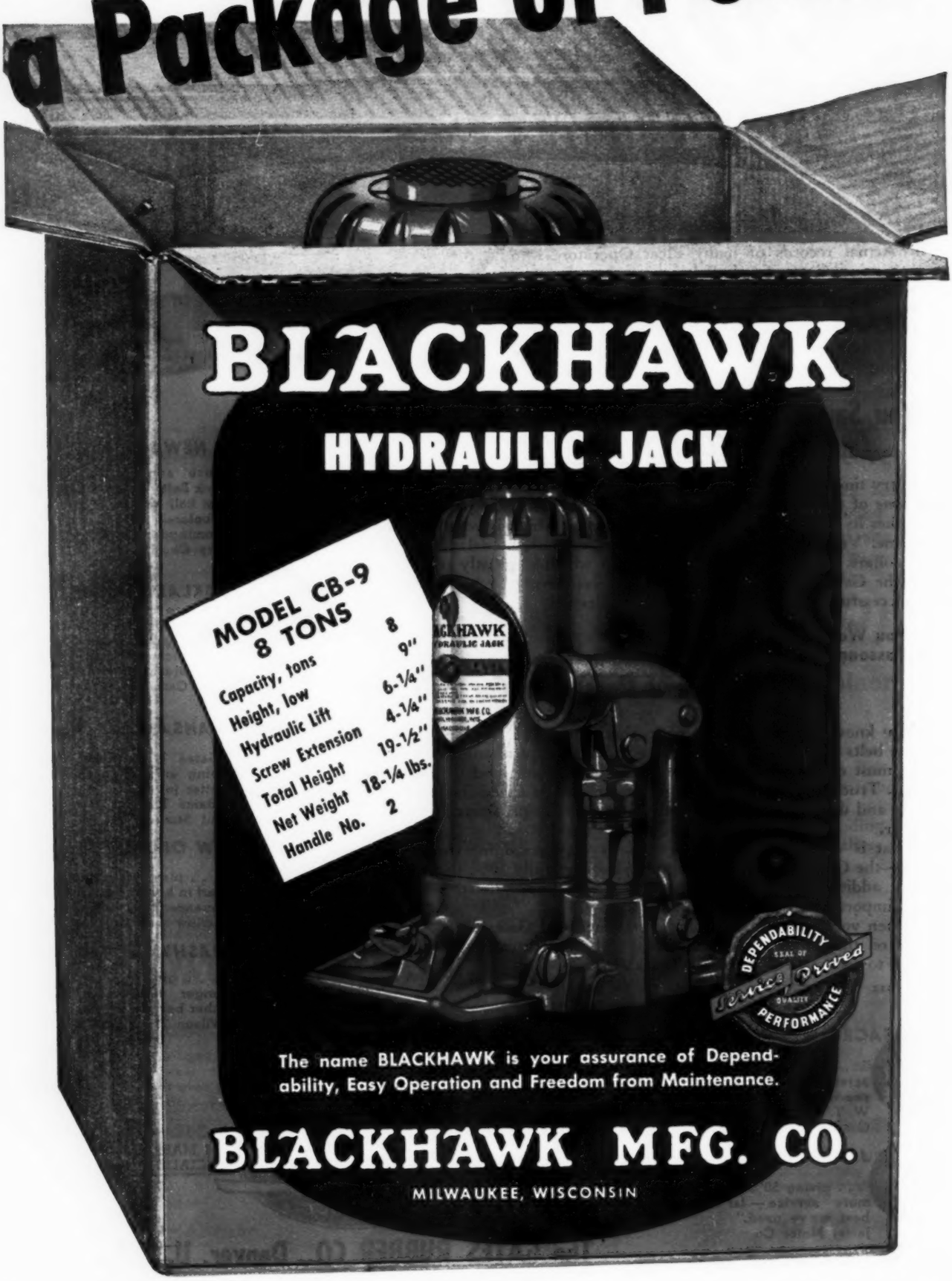
50% TO 60% LONGER LIFE — **MAYWOOD, Ill.**
"Our records show 50% to 60% longer wear."
Midwest Transfer Co.

Gates Jobbers Now Have Stocks to Serve You

THIS IS A Gates PRODUCT — THE MARK OF SPECIALIZED RESEARCH

The GATES RUBBER CO., Denver, U. S. A.
World's Largest Makers of V-Belts

a Package of Power



FLEET OWNER

DEVOTED TO THE BETTER OPERATION AND MAINTENANCE OF ALL AUTOMOTIVE FLEETS

Vol. 36, No. 2—February, 1946

WASHINGTON REVIEW

FAMINE IN TRUCKS?

● The year 1946, so far as your chances of getting new trucks are concerned, is going to be as tough or tougher than the war years. . . . There has been an increasing demand for the heavier types of equipment and manufacturers are anxious to fill this demand, but are prevented from doing so until various materials are more available than they have been to-date.

Such is the expressed line of thinking of one of our major truck company executives—J. N. Bauman, vice-president of White Motor Company—in addressing truck operators who attended the ATA Convention held in Cincinnati last month.

"There probably is a deficit of 2½ million trucks as a result of wartime production restrictions," he said, "and a substantial portion of this unfilled demand comprises heavy trucks. Stoppages of material flow, due to labor and other conditions, are preventing the fulfillment of this demand. Until such stoppages clear up, the motor truck manufacturing industry cannot go into full production," he continued, "and this is a condition which will continue until at least mid-1946."

Final production figures for the year of 1945 are given elsewhere in this department. As this is being written (Jan. 25th), the outlook for new vehicles has not changed for the better. True, a few strikes that have been causing production bottlenecks, have been settled, which has permitted some manufacturers to resume modest production. On the other hand, the steel strike, which has just begun, bids fair to slow down the whole picture, should it be of anything but the shortest duration.

We will not, therefore, attempt to publish any production figures by months, as was our former practice. In the first place, actual figures are not too easy to get, and when one does get them, they are often not exactly up-to-date or correct. However, when the situation straightens out, and there is something worth talking about, we will resume our practice of keeping you informed on the truck industry's accomplishments, by months.

And what about the car picture for 1946, you ask? Well, current opinion is that automobile output is now being figured at less than four million cars this year, compared with about six million originally forecast. Maybe even that is optimistic, when you consider that car production, since V-J Day has been less than 100,000 units. . . . Here is a "box score" of how cars are supposed to be rolling off the assembly lines, as this is being written; the figures are per day: Ford 1,200, Chrysler 1,000, Studebaker, 200, Hudson 200. No figures were given for anyone else, but Packard is probably also producing some of its "Clipper" models.

So much for the figures. Maybe you will be interested in reading the automotive outlook, as viewed through the Automobile Manufacturers Association's glasses? It follows immediately.

●

THE A.M.A. OUTLOOK

● The motor truck industry is viewing the outlook for 1946 through what might be called bifocal glasses. The immediate prospect for the production of trucks is uncertain, of course, with the extent of labor troubles, rather than plant capacity, the determining factor. . . . The long-range outlook of officials of the Automobile Manufacturers Association is for a number of years of record production, to meet the heavy demand that has accumulated during the war.

Conservative estimates are that the motor truck manufacturers will have

JOINS "FLEET OWNER" STAFF

● J. HOWARD PILE has recently joined the staff of this publication as Business Manager. He was formerly vice-president and editorial director of the Chek-Chart Corporation, Chicago.

During his 15 years' association with Chek-Chart, he has acquired a wide acquaintance in the automotive and petroleum industries, especially in the engineering and marketing phases of the latter.

Outstanding among Mr. Pile's many accomplishments has been the development of lubrication charts and service systems, in collaboration with practically all of the major oil companies.

Mr. Pile has also been prominently active in the Society of Automotive Engineers, having been chairman of the Chicago Section in 1942. He has been vice-chairman of the SAE National Sections Committee for 1945 and a member of the Clarkson Memorial Committee for the past three years.

He is also well known among the nation's leading fleet operators, as well as engineers and service executives of car and truck manufacturers, and has had many technical articles published in the trade press, both here and abroad.

Mr. Pile's previous experience also includes several years as Service Manager of a General Motors unit, as well as Technical Editor of Motor World and Associate Editor of Commercial Car Journal and Automobile Trade Journal.

WASHINGTON REVIEW....

Continued from Page 55

the capacity to produce at least 1,000,000 trucks in 1946, or about 40 per cent more than the average during the five-year period from 1935 to 1939, before production was increased by the flood of war orders. . . . This contrasts with an estimated production of 352,000 military and 316,000 commercial trucks or a total of 668,000 in 1945. . . . Truck manufacturers, generally, have emerged from the war with expanded production facilities. Many of them are now completing programs to expand from 25 to as much as 200 per cent.

The demand situation from a long-term standpoint never was better. The average truck on the highway today is more than 7½ years old. Owners of light and medium-sized trucks in general are in a worse position than the owners of heavy-duty trucks, as some production of the latter type of vehicle was permitted during the war. At least 2,000,000 trucks in this country have been kept operating long past their normal lifetime, and will be replaced by new trucks when such vehicles are available.

Therefore, on the most conservative basis, an annual production of 1,000,000 trucks during the next four or five years will be needed to meet domestic and export requirements, and to replace the "over-age" trucks now in use. And this figure does not make any allowance for additional demand which might arise out of a prolonged period of prosperity, development of new uses for trucks, or increases in exports.

The experience in the year recently ended provides an excellent illustration of the way production schedules can be upset by labor troubles. Because of the similarity of many military trucks with those used commercially, reconversion of facilities from wartime to peacetime production was simpler for the motor truck industry than for many others. But in spite of the speed of reconversion, output during the last six months of 1945 was only about two-thirds that of the first half of the same year.

MORE timely advice from National Safety Council is given by Lois Johnson, amateur skating queen. Main causes of winter accidents are skidding and poor visibility. Let's check our chains, defrosters, etc.

The War Production Board early in July authorized the automotive industry to turn out 548,172 commercial civilian trucks in 1945, or 232,000 more than actually were produced. The production goal was set at attaining a rate of 90,000 trucks a month by December, but production in that month only reached about one-third of the goal.

Strikes among suppliers as well as in the industry have kept production down. And even if labor troubles could be cleared up over-night, many of the shortages caused by strikes would continue to hamper production. Shortages of such materials as osnaburg, used in upholstering, and glass, are certain to continue well into the current year.

The motor vehicle industry, having completed its war job with distinction, is ready now to tackle its peacetime assignment. Barring prolonged labor tie-ups and material shortages, the industry is ready to do its part to turn out a record number of trucks, so that there will be no impairment in the vital services provided by trucks in peacetime, just as there was no impairment in those services during the war.

•

NEW TRAILERS ON THE WAY

● Keeping one's ear to the ground is a difficult thing today, what with the uncertainties of production and the reticence on the part of manufacturers to release anything until they are sure they will be able to go ahead and produce it. However, two new trailer developments, revealed at the recent ATA meeting in Cincinnati, provide some details as to what is in the offing, so far as new trailers are concerned.

The Fruehauf Trailer Company displayed a scale model of a tandem type of trailer axle construction, utilizing the well-known "gravity spring suspension" and employing torsion-rods instead of springs. . . . Undoubtedly, this publication will present the conventional publicity release on this new development, with a complete set of photographs, just as soon as the manufacturer gives us the green light.

The Trailmobile Company also displayed something new—a plastic cutaway trailer job, which attracted much attention because it enabled the folks to see right through the various units and understand the assembly details. The new Trailmobile job features a full-length frame—not exactly a frameless design—but one that is said to be engineered to carry towing as well as load-carrying stresses.

Trailmobile also displayed its "electronic" test car, which has been used to electrically measure the strains and stresses encountered in various parts of the new trailers. . . . We have been endeavoring to get the full story of these new models for you and have reason to believe that the official releases will be forthcoming in a very short time.

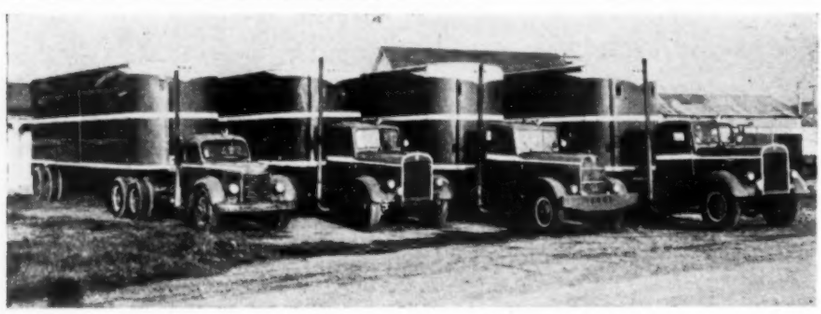
•

TWO-WAY RADIO IN CABS

● By the time you read this, at least five taxicabs in the city of High Point, N. C., may be equipped with two-way radio communication equipment. This is mentioned here because it is the first installation of its kind (in taxicabs) that has come to this publication's attention.

According to J. F. Beck, president of the Blue Bird Taxicab Company there, his company recently received final notification that the Federal Communications Commission had granted them the necessary license.

An antenna will be installed on one of High Point's tallest buildings and as this was written, the equipment



HERE's part of a fleet of 10 Diesel-powered trucks and 14 Fruehauf semi-trailers, operated by a man who is said to be the youngest major truck fleet operator on the west coast, Vic Suglio of San Jose, Calif. . . . Each of the green-and-white vans gets a scrub-down after every trip, making the fleet one of the best-looking on west coast highways.

PLENTY OF LOW-COST MILEAGE!

It's Studebaker's rugged, powerful, thrifty 1½-ton truck

EXPERIENCED truck operators the nation over are glad to see the pace-setting Studebaker organization back on the job of building civilian trucks.

They know that Studebaker sets the highest quality standards in the motor truck industry—standards that are a constant challenge to all other manufacturers of motor trucks.

They know further that Studebaker has successfully solved the problem of designing a truck so that it gets the maximum mileage out of every gallon of gasoline and every set of tires.

You can rely on Studebaker

One Studebaker truck model that's especially well-suited to today's needs is the capacious, powerful, 1½-ton Studebaker pictured above, available as cab-and-chassis for standard and special 12-foot bodies.

This economical, husky Studebaker has the same kind of sound, solid quality throughout that won highest commendation for nearly 200,000 rugged Studebaker military trucks in tough war service.

Studebaker also builds half-ton and one-ton trucks—and 1½-ton models in several wheelbases. At present, demand is greater than supply—but, in good time, everyone who wants a Studebaker truck can get one.

And remember, every truck with the Studebaker nameplate is designed to add new luster to the time-tested Studebaker reputation for trustworthy, low-cost transportation.

Over 94 years' experience in supplying America with outstanding hauling equipment stands behind Studebaker's ability to offer you the utmost truck value for your money. See your nearby Studebaker dealer.

Studebaker

South Bend 27, Indiana, U. S. A.

PIONEER AND PACEMAKER IN AUTOMOTIVE PROGRESS

WASHINGTON REVIEW....

Continued from Page 56

(Bendix make) was on its way for installation.

Mr. Beck predicts that the new system will enable his dispatchers to have constant control of all cabs and should assure High Point residents greatly improved taxicab service. He estimated that when his entire fleet is equipped, anyone will be able to get a cab to his front door in from three to five minutes after making the call.

As in other mobile installations, a loud-speaker receiver and transmitter will be installed in each cab, enabling the dispatcher to contact each driver, and each driver to contact the central dispatching agency at will. Thus, the nearest cab may be sent to answer any particular call. (We understand that another taxicab company—in another city—has also received an FCC license, but High Point is the first one on which we have received details. —*Ed.*)

●

OUTLOOK FOR MECHANICS

● A wealth of valuable information has been presented by the Bureau of Labor Statistics of the U. S. Department of Labor, in their recently-published occupational studies for veterans and other apprentices desiring to take up the work of automobile mechanics.

It was prepared for use in vocational counseling and describes the nature of this occupation; its status, both before and during the war; the prospective labor demand and supply; matters of education and training; and a report on working conditions and a schedule of earnings.

This is one of a series of occupational studies and is known as Bulletin No. 842, priced at ten cents by the U. S. Government Printing Office, Washington, D. C.

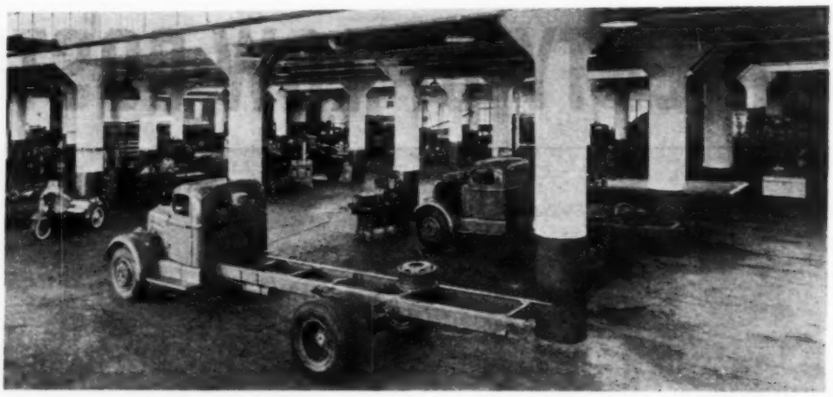
●

2-WAY RADIO PROGRESS

● Last December we reported the first details of the 2-way truck radio project inaugurated in Chicago, by Highway Radio, Inc. (The announcement appeared on page 57 of that issue). . . . Considerable progress has been made to-date, it was reported by Harry F. Chaddick at the recent ATA meeting in Cincinnati. Mr. Chaddick is chairman of ATA's Highway Communications Committee.

According to Mr. Chaddick, the fixed station is ready for service and one truck has already been equipped with a 2-way receiver-transmitter, and is providing experience to guide future installations.

The plan, as we have reported previously, is to install 2-way sets on 100 vehicles operating in the Chicago area, as provided by the FCC license. It is also planned to install 1-way sets (receivers only) on some 500 other trucks. . . . Two-way radio communication in trucks is progressing—slowly but surely.



HERE are the general truck repair bays in the Los Angeles Branch of the White Motor Company. . . . Some 28,000 square feet of floor space are available, plus the latest in modern automotive shop equipment, including traveling overhead cranes, lubrication rack with twin-hoist lifts, lots of engine tune-up equipment — and countless others.

●

CONSERVE BATTERIES

● "Unless governmental restrictions on lead now controlling automotive battery production can be lifted or eased during the next few months, motor vehicle operators will be faced with an increasing shortage of batteries during 1946," according to Royce G. Martin, Auto-Lite executive.

Allocations of lead for the first quarter of 1946 will allow the battery industry to produce a quantity equal to 22 percent of the total replacement batteries produced in 1944. . . . While this lead allocation is slightly in excess of the corresponding period for 1945, it is not as favorable as the allocations for the third and fourth quarters of last year.

This lowering of lead allocations, plus the fact that the replacement battery market is inflated approximately 40 percent, is contributing to a critical situation in the months to come.

The battery industry is urging all of its dealers to offer the best possible battery service to their customers, in order to prolong the life of batteries now in operation—especially during the cold months, when battery failures are most prevalent.

FROM St. Louis to the Coast in 3½ days. . . . Bob Kilbride of Pacific Intermountain Express receives manifests for 32,000 lb. of civilian cargo from driver Cochell. . . . 30 mph was averaged on the 2,241-mi. trip.

●

RUBBER REPORT

● Passenger-car casing production rose 1.55 per cent in November, The Rubber Manufacturers Association reported last month, in its monthly report on the output of automotive pneumatic casings. November production was at the rate of 44,202,264 passenger-car casings a year. Production of truck and bus casings was off 7.74 per cent from the preceding month, at 989,695 units Output of passenger, truck and bus tubes declined 0.69 per cent.

Slight though it was, the advance in passenger-car tire production was construed by the association to reflect an improving situation with respect to manpower and other factors, which foreshadows rising production throughout the year ahead.

The report proves, however, that several months of increasing production will be required to fill civilian distribution pipelines, which have been almost exhausted in the four war years, and to establish adequate working inventories, if passenger-car tires are to be brought into anywhere near normal supply in 1946. Until this process of restoring balance has progressed appreciably, most of the new production should be chan-

VALVOLINE FLEET LABORATORY SERVICE

tells you positively--accurately whether or not you are using

THE RIGHT GRADE MOTOR OIL--THE CORRECT DRAINAGE PERIOD

There's one sure way to find out whether you're getting efficient lubrication in your truck or bus fleet—have a step-by-step chemical analysis of crankcase drainings made by the Valvoline Fleet Laboratory Service.

Many users of Valvoline are increasing operating efficiency and decreasing maintenance costs by having this regular analysis made. It gives an accurate checkup on operating conditions based on actual analysis facts and figures and translated into simple, practical recommendations.

Even though you are using the correct grade of motor oil, such a test might reveal hidden causes of excessive engine wear and breakdowns caused by improper driving or other conditions.

• • •

5,000 miles of grueling service in a bus—that's a lot to ask of any motor oil. Yet crankcase drainings of Valvoline, taken from two buses were tested and found normal on every count. They were still giving efficient lubrication—after this performance! (Case History C-2554—name on request.)

And incidentally, the buses of this fleet run a total of 16,000,000 miles a year—on Valvoline! The reason this fleet can go beyond 5,000 miles in these units on Valvoline is because our Fleet Laboratory Service determined the condition of the oil at that mileage. Get out of trouble—*stay* out of trouble with Valvoline!

Write, phone or wire your nearest Freedom-Valvoline branch today!

VALVOLINE

THE ORIGINAL PENNSYLVANIA MOTOR OIL
COSTS MORE TO MAKE — COSTS LESS TO USE

FREEDOM-VALVOLINE OIL COMPANY

431 Main Street, Dept. 42 B Cincinnati 2, Ohio

New York - Washington - Toronto - Pittsburgh
Atlanta - Detroit - Chicago - Los Angeles - Vancouver, B. C.

Refineries at Butler and Freedom, Pennsylvania

WASHINGTON REVIEW....

Continued from Page 58

nelled for distribution to emergency and hardship cases and the most essential drivers, the association said.

The report does not include tires for agricultural or aviation equipment, bicycles, motorcycles, industrial tires or solid rubber tires.

•

REPORT ON PRODUCTION

● Between strikes and material scarcities, production of civilian passenger-cars and motor trucks fell far short of expectations in 1945.

Since May 24, when the Government gave the automotive industry the green light on car production, only about 75,000 passenger vehicles had been made, up to the first of this year.

This rate of completion for passenger-cars is about 15 per cent of original 1945 estimates. Vehicle makers had expected to turn out a minimum of 500,000 cars before the year-end. Plans called for producing around 250,000 units in month of December alone.

What came out of the plants in 1945 was just enough to average 2.2 cars per dealer in the United States. Even so, this is only an assumptive figure, inasmuch as some companies have not as yet distributed cars to their individual outlets.

In the truck field, companies were rapidly geared to meet 1945's schedule of 548,172 vehicles, authorized by the War Production Board. Actually, truck production reached but 315,000 units during the year of 1945.

•

TIRE MARKINGS EASED

● Effective immediately, synthetic tire casings may be manufactured without the "red dot" identification marking, the Rubber Division of the Civilian Production Administration announced last month.

Amendment 2 to Appendix II of Rubber Order R-1 eliminates the "red dot" identification requirement. The change will result in a saving of considerable labor.

Synthetic pneumatic tires or tire casings will continue to bear on both sides of the tire a permanent brand indicating the synthetic construction used in the manufacture of the tire. This brand must be at least 5/8 of an inch high, unless a brand of this size is found to be unreasonably large.

The brand for tire casings made of synthetic rubber will continue to be the letter "S", together with the number identifying the synthetic construction.

THESE boys are repairing trolley wires, but their route is guided by 2-way radio. Capital Transit Co., Washington, D. C., recently installed 2-way radio to connect its dispatcher's office and repair crews.

•

USED CAR CEILINGS DOWN

● Ceiling prices for used passenger-cars were reduced 4 percent on January 1, in accordance with the "rollback" provisions of the used car prices regulation. . . . The reduction in price applies to used cars sold by either dealers or private owners.

OPA's price regulation for used cars provides that ceiling prices be reduced 4 percent every six months, to cover depreciation. . . . On July 1, 1945, under this provision, a previous 4 per cent reduction in ceiling prices became effective.

•

USED 1946 TRUCK CEILINGS

● Ceiling prices for used 1946 model commercial motor vehicles—trucks, truck-trailers and motorcycles—were established by the Office of Price Administration recently at the same percentage levels in relation to new vehicle prices as those provided for 1945 models.

At the same time, the present schedule of percentages used in computing ceilings for used commercial motor vehicles was extended for use in 1946, pending further study by OPA as to whether there should be any reduction in these percentages to compensate for depreciation from age. This action is retroactive to January 1, 1946.

Under the action, ceiling prices for used 1946 model commercial motor vehicles are established as 103 percent of the new vehicle list price when sold on a warranted basis, and 81 percent of that price when sold "as is." The list price of a new vehicle is lower than the delivered price, which includes taxes, transportation and handling and preparation charges.

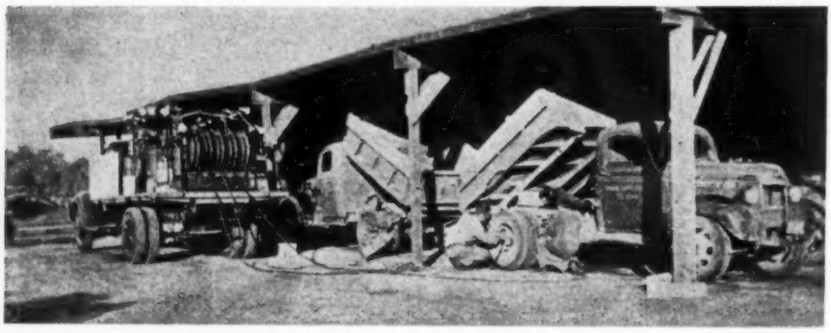
A warranted vehicle is one which is reconditioned and sold by a dealer with the guarantee that he will pay one-half of the cost of any new parts, except tires, tubes, paint, glass or upholstery, required by the vehicle in the first 30 days after sale or 1,000 miles of driving, whichever comes first. . . . A vehicle sold "as is" is one sold without guarantee as to its performance.

•

TIRE MANPOWER BETTER

● The manpower situation—No. 1 headache in the rubber industry since large-scale synthetic rubber production solved its wartime raw material crisis—is said to be greatly improved by the re-employment of servicemen, now reaching substantial proportions.

One large company—B. F. Goodrich—reported that in its Akron plants November was the biggest employment month in ten years; that about 75 percent of those employed during the month were ex-servicemen; and that by December 31 more than 25 percent of the 11,000 who went into the services from the company's plants and offices throughout the country, had been re-employed.



THESE dump-trucks are being serviced by a new portable lubricating unit, called the "Convoy Luber", built by The Gray Company, Minneapolis, Minn. . . . Mounted on a truck or trailer, the outfit brings high-pressure lubrication and related services out to the job where fleets of trucks, construction machinery, etc. may be working steadily.

What kind of *Oil* are your bearings being fed?

A LAZY OIL
that only lubricates

... OR HARD-WORKING *TALPEX*
that not only lubricates but does 4 extra jobs

1. Has high detergency. Helps keep carbon, lacquer and foreign particles from adhering to pistons and rings, valves, ports.

2. Has exceptional Oxidation Stability. Holds to a minimum the formation of sludge, lacquer and other products of deterioration.

3. Has low Carbon-Forming Tendency. Reduces ring sticking and wear. Lengthens engine life.

4. Is non-corrosive to alloy bearings. Protects all lubricated engine parts against corrosion.

• You may think you've "hired" the hardest-working oil in the world to lubricate your engines. Then bang! You're in hot water. That's the trouble with a lazy oil. Its laziness shows up *after* you use it. Then the damage is done. To avoid engine troubles caused by an oil that does only one or two jobs in your engines, switch to hard-working Talpex. It not only does a good job of lubricating, it does all of the *4 extra* jobs that must be done if your engines are to be kept perking at their efficiency peak.

If the oil you now use is not doing all these jobs, it's lazy—should be changed to hard-working Talpex. Ask the Shell man to show you why.

Shell Oil Company, Inc., 50 West 50th Street, New York 20, N. Y.—100 Bush Street, San Francisco 6, Cal.

TALPEX

The All-Purpose, Heavy-Duty Lubricant
For trucks, buses, tractors, shovels, stationary and marine Diesels

SHELL

WASHINGTON REVIEW....

Continued from Page 60

MORE CAR CEILING PRICES

● OPA last month announced retail ceiling prices for 1946 model Plymouth, Dodge, DeSoto, Chrysler and Ford passenger-cars. These retail ceilings reflect an absorption by dealers of 2.5 percent of their pre-war profits. This has been allotted to manufacturers to compensate for increased production costs.

Actually, the retail ceilings for 1946 model Fords are 2 percent more than October 1941 prices for 1942 models, plus from $18.10 to $47.29 for engineering improvements in the new car, varying with the models. (Ceilings for four other Ford models were set previously by OPA).

The new Plymouth ceilings are a 1 percent increase over 1942 models, plus from $70 to $121 for engineering improvements. . . . Dodge prices are 3.5 percent higher, plus from $59 to $68 for engineering improvements. . . . DeSoto prices are 1.8 percent higher, plus from $59 to $66 for engineering improvements. . . . Chrysler ceilings are less than half of 1 percent higher, plus from $90 to $104 for engineering improvements. . . . All of these ceiling prices are f.o.b. Detroit, of course.

●

FLEET DISCOUNTS ON CARS

● In announcing the ceiling prices on several Ford passenger-car models which had not previously been given ceilings, the OPA definitely went on record in regard to its policy on fleet discounts. We quote from OPA's statement:

"The Ford Motor Company is authorized by OPA to sell cars to users, such as fleet owners, at the retail ceiling price, less 90 percent of the discount customarily given the buyer on January 1, 1941."

●

THE TIRE STAMPEDE IS ON!

● Lifting of tire rationing has brought down upon the rubber manufacturing industry a virtual avalanche of consumer demands for new tires. Millions of motorists who were counting on tires in January and February are being disappointed. . . . The Rubber Manufacturers Association states that "fully normal stocks of tires may be as far away as 1947".

In light of the tremendous demand that has been built up in the past few weeks through tens of thousands of tire dealer outlets in the nation, it is believed that the scarcity of passenger-car tires will continue extremely acute throughout 1946. . . . RMA urges that motorists be discouraged in the strongest terms from the indiscriminate buying of tires where they are not absolutely necessary. . . . Tire conservation will remain in order for many months.

MORE fast ground and air service on household goods. . . . These two trucks of Manhattan Storage Company recently loaded a big American Airlines cargo plane with a shipment of household goods, for non-stop flight from New York City to Los Angeles. . . . When the plane arrived, Bekins Van & Storage Company of Los Angeles, did the unloading.

●

RECAPS to CARRY 40% in '46

● Four out of every ten passenger-auto wheels in this country will be rolling on recapped tires in 1946—especially during the first half of the year—James J. Newman, vice-president of The B. F. Goodrich Company, said recently.

Mr. Newman warned against the danger of wearing present tires down beyond the good-for-recapping stage, because it may be "nearly a year" before one can be sure of getting just the new tire he wants, when he wants it. . . . The camel-back recapping material now available is Grade A, synthetic rubber, he said, vastly superior to the material used in the first wartime recaps, and actually delivering 90 per cent as much mileage as would come from top-grade natural rubber.

"Tire dealers have very low inventories now, against a pre-war normal of about seven million passenger-car tires in inventory," Mr. Newman explained, "and the estimated demand for 73 million tires in 1946—to meet original-equipment and replacement needs — will severely tax the industry's production facilities but still not provide for any substantial upbuilding of inventory."

More than 70 million recaps have been put on passenger-car tires since Pearl Harbor, according to B. F. Goodrich estimates, Mr. Newman said. Naturally there will be a marked decrease in this business once tire supply-and-demand returns to normal, he added, but it will eventually stabilize on a definitely higher level than it knew before the war. . . . In the truck and bus field there will be a much greater rise in the tire-rebuilding and recapping field, he said.

THIS big Mack squad car, completely covered with ice, made the trip back to the fire house under its own power, after the crew cleared the windshield. . . . The job was a big Chicago fire last winter.

●

BATTERY, CHARGER CEILINGS

● Dollar-and-cent ceiling prices established November 15, 1945, on new battery chargers and new storage batteries declared surplus by the armed forces, have been revised. The changes became effective January 7, 1946.

On storage batteries, the dollar-and-cent ceilings already established for eight different types continue in effect as a base, with the reseller permitted to add freight and costs for filling and charging the batteries, where such costs are incurred.

The previous ceilings for battery chargers are completely changed. Two ceilings are now established. For sales by manufacturers to distributors, the ceiling will be $29.50, less 40 percent and 5 percent, f.o.b. shipping point. . . . For all sales to users, the ceiling will be 175 percent of the amount actually paid to the Government or manufacturer, but not to exceed $29.50 each. This revised pricing is in line with customary trade practice, OPA says.

WANT TESTED TOUGHNESS?

Specify

New TIMKEN S & U-300 2-Speed Double-Reduction Heavy-Duty Axles . . . Available NOW!

Postwar ADVANCED RELATED DESIGN

NOTE: *Large hypoid gears for first reduction. Choice of "fast" and "slow" helical gears for second reduction.*

- New 2-Speed hypoid-helical double-reduction drive.
- Famous Timken Easy-Power Shift for shifting to "fast" or "slow" axle speed in a split-second — without declutching. Vacuum or air actuated.
- New Torsion-Flow axle shafts forged of Timken "Axaloy" steel.
- New heavy-duty DP Dual-Primary hydraulic brakes, or famous P Series power brakes.
- New rigid mountings for gears.
- New, stronger differential with 9-16 tooth combination.
- New transfer bar hook-up for P Series power brake-equipped axles. New protected location for brake chambers.
- Double-reduction final drive units and 2-speed double-reduction final drive units are interchangeable in S and U Series axle housings without changing axle shafts.

"It's a helluva good axle," operators will tell you, "if it is anything like the famous S and U-200."

Fact is, the new S and U-300 axles are identical to S and U-200's, except that the 300's are 2-speed double-reduction instead of single-speed double-reduction.

What does this sameness mean?

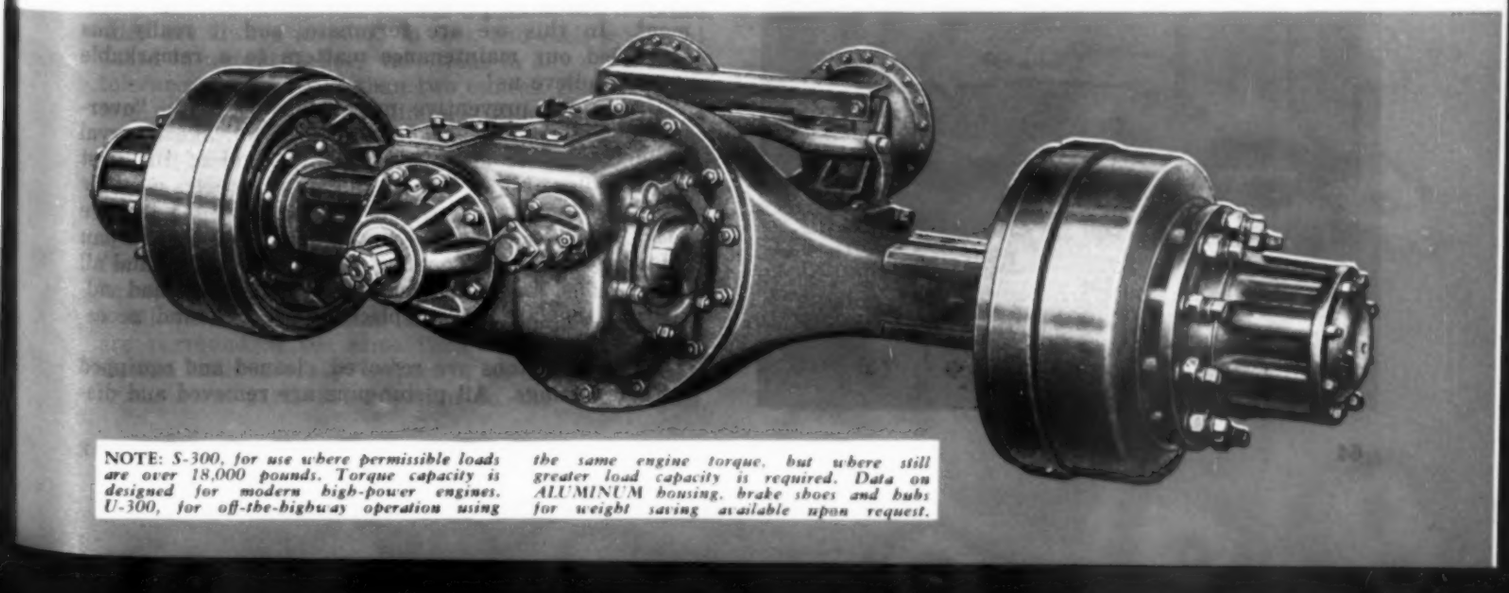
It means, first, that the new 300's are **proved** axles—proved by millions of miles of rough, tough service. It means that they have dozens of brand new design and performance features built into them. But—**most important**—these axles are in **full production now—the only postwar 2-speed double-reduction heavy-duty axles immediately available!**

For tested toughness—for all that's latest and best in modern axle design—specify TIMKEN S or U-300 axles under the next trucks you buy.

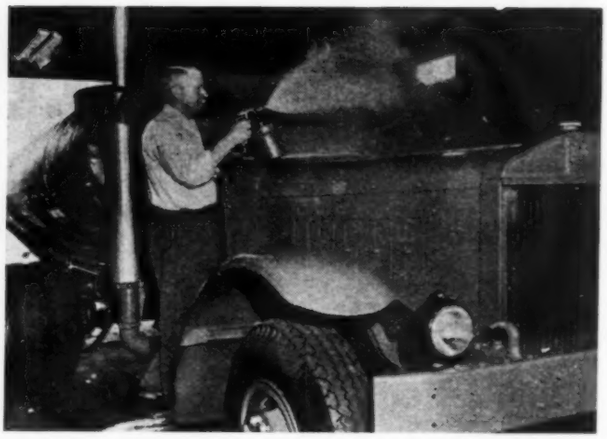
The Accepted TIMKEN AXLES Standard

TIMKEN AXLES

THE TIMKEN-DETROIT AXLE COMPANY, DETROIT 32, MICH.
WISCONSIN AXLE DIVISION OSHKOSH, WISCONSIN



NOTE: *S-300, for use where permissible loads are over 18,000 pounds. Torque capacity is designed for modern high-power engines. U-300, for off-the-highway operation using the same engine torque, but where still greater load capacity is required. Data on ALUMINUM housing, brake shoes and hubs for weight saving available upon request.*



BILL Peters is a super who can swing a paint gun in good style. Besides managing the fleet, he does all vehicle painting himself.

SERVICING A DIESEL

FLEET of 11 TANKERS DOES 70,000 MI. Per

HERE's the story of a Diesel-powered fleet which is small, but its mileage and maintenance program are impressive. . . . And it's all done without a lot of expensive "paper work". . . . The details of this maintenance set-up are well worth your careful scrutiny.—Ed.

BECAUSE Service Tank Lines is a contract carrier of petroleum products, with a large part of its route through mountain passes and over desert roads, between Santa Fe Springs, Calif., and points in Southern California and Arizona, our vehicles must receive the best of maintenance attention to keep them standing up under this tough operation.

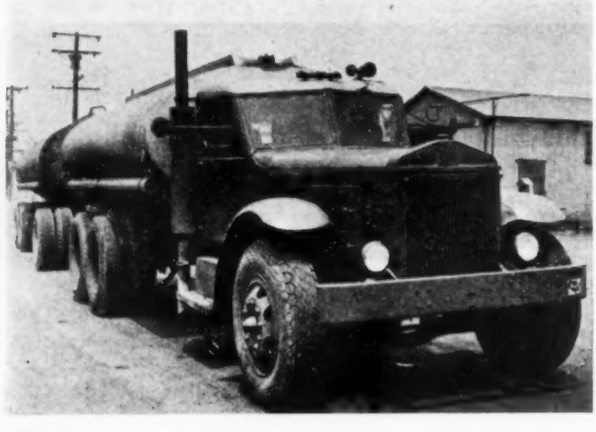
At the time of this interview, we were operating eleven tank units (combination of six-wheel truck and full trailer) similar to the one illustrated at the bottom of this page. These are Sterling 6-wheelers, powered with Cummins Diesel engines. We also have two extra engines for use as spares, and among all thirteen engines we are piling up an impressive total of truck-miles at the rate of 70,000 miles per month, hauling a combined load of 7,500 gallons in each unit—which is just about what is carried in the average railroad tank car, we believe.

With our maintenance shop located near Santa Fe Springs (which is close to the refinery for which we do the hauling), this enables us to give all of our vehicles an immediate inspection upon their return from each trip, at which time each driver turns in a Driver's Report, similar to the one shown on the fourth page of this article, listing any work that might be needed to be done on the two pieces of equipment (truck and trailer) in his charge.

This form is then given to the shop foreman or inspector, and when the inspection is subsequently made, the Driver's Report and the other form (shown on page 68) constitute the basis for performing any kind of "running maintenance" that may be needed. In short, this is all of the "paper work" utilized in the maintenance of this neat little fleet of tank-truck trailer trains.

In addition to running maintenance, two types of lubrication jobs are done on all vehicles in this fleet. One we call the "Short Lube", which is performed at intervals of 750 to 1,000 miles, depending upon the scheduled runs. On this short job only the driveline, clutch throw-out bearing, front-end and fifth wheel will get the necessary lubrication attention. The regular or "Long Lube" job is done at 1,500-mile intervals.

THIS is typical of the fleet—a 7,500-gallon, 2-unit road train. Truck is a Cummins-powered Sterling 6-wheeler, pulling full trailer.



Instead of using printed forms to schedule our truck preventive maintenance, inspection and lubrication work, we have installed a large blackboard, which serves very satisfactorily and cuts down the "paper work." During the war, when manpower was extremely tight, we had cut our clerical work to the minimum, and we are still operating that way. This "minimum" was arrived at by the simple expedient of limiting all clerical work to that which the writer could conveniently perform himself.

One reason, perhaps, why this short-cut seems to have worked out so satisfactorily, is because we have a fine group of experienced drivers, most of whom have been with us for many years. The cooperation of these drivers is splendid and they make it their business to *see* that the blackboard is kept marked up, and that all of our trucks and trailers get their proper share of preventive maintenance shop treatment. In this we are fortunate, and it really *has* simplified our maintenance matters to a remarkable extent, believe us!

Under our preventive maintenance system, "overhauls" are performed at an average mileage interval of 80,000 miles, as follows: At the end of the first 80,000 miles of operation, each engine receives a *minor* overhaul by being partially dismantled. The valve rocker-arm covers the cylinder-head and the oil-pan are first removed. Then the fuel pump is tested and all connections, including injectors, are tested and adjusted; the latter are replaced, if it is found necessary.

Next all pistons are removed, cleaned and equipped with new rings. All piston-pins are removed and dis-

AFTER 240,000 miles of service, all trucks and trailers, as well as engines, get real overhauls. Here a spring hanger is checked.

JUST an ordinary greasing shot, but this fleet is unique in that it has two types of lube jobs—a "short" lube and a regular one.

FLEET with BUT 2 PRINTED FORMS . . .

MONTH, UNDER SIMPLIFIED But THOROUGH MAINTENANCE PLAN

By W. J. Peters,

Manager,
Service Tank Lines,
Los Angeles, Calif.

carded at this time. This is done regardless of their condition, as we do not believe that they should be used for another 80,000 miles of service; we also feel that old piston-pins will not give entirely satisfactory service with new rings in the pistons, if there is the slightest bit of wear. In other words, while this may sometimes be considered unnecessary, we do it the "hard way" and take no chances.

When replacing the pins, the piston-pin bushings are reamed to the next oversize and the new pins are then installed. We have rigged up an ingenious boring-bar device, to make sure that the piston-pins will be reamed squarely with the connecting-rod bearings. At this time we carefully inspect all pistons and test them for defects or wear—and replace them with new ones, if necessary. At the same time all connecting-rods are checked by the Magnaflux method.

When new connecting-rods and pistons are installed, they are always installed in sets, and each set is balanced in weight to keep variations in any one set to a tolerance of not more than two ounces. Standard factory parts are used at all times, if they are obtainable.

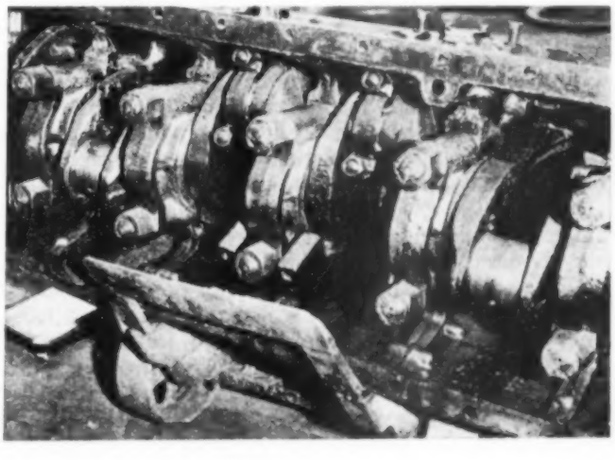
All main and connecting-rod bearings are carefully inspected at this time, and checked for cracks, checks, flat-spots and other signs of impending failure, to make sure that, if they are re-installed, they will give satisfactory service, except for mishaps, for the next 80,000 miles, after which the second "minor" overhaul will take place.

All valves are refaced and the valve-seat inserts are reground at the same time. Cylinder-heads are cleaned and carefully inspected, as are the rocker-arms. New parts are installed in the rocker-arms, shafts and pin-pushings, should wear be noted beyond the accepted tolerances set up by the engine manufacturer.

At the same time that the engine is being gone over, of course, the truck is also receiving a minute inspection and check-up, which includes the removal of all wheel bearings. After cleaning and inspecting, the latter are packed with grease and adjusted. All drive-chains and sprockets are also checked for wear and adjustment at this time, as are brakes, running gear, clutch and transmission, safety equipment, etc. When this "minor" overhaul is completed, the engine, truck and its trailer are once again ready for their strenuous job of over-the-road petroleum hauling.

When the second 80,000 miles has been covered (160,000 miles), the second "minor" overhaul is given to each unit. For the Diesel engine, this treatment is comparable to the (*Please turn to page* 66)

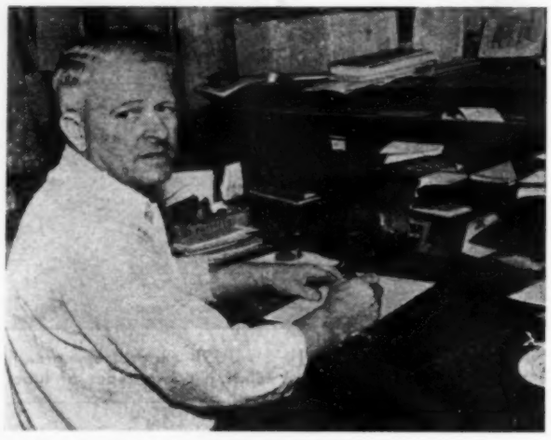
USE of a popular additive in the oil helped keep this engine clean, prior to its 80,000-mi. overhaul. This block has done 750,000 mi.



first one, just described. This also applies to other parts of the truck and trailer, except that the sprockets and drive-chains are removed and *new* ones installed, to maintain the least possible backlash in the running gear, and to guard against road failures of this important unit of the drive mechanism.

When the third 80,000 miles of service has been reached (240,000 miles), the truck and trailer are given the same "minor" overhaul treatment, but the engine, however, gets a "major" overhaul. At this time the engine is torn down completely, after its removal from the truck chassis.

At the time of this interview, there was a veteran Diesel engine in our shop with a total of 750,000 miles of hard lugging chalked up against it. This engine was then getting its *third* major rebuilding in our own shops, where incidentally, we do all of our own work except crankshaft regrinding and cylinder reconditioning. And this particular engine has been in continuous service since 1936 —nine full years!



MEET Manager W. J. Peters at his desk. When he's not painting trucks, keeping books and time, he is planning the maintenance schedules for this Diesel fleet. He acts as time-keeper, bookkeeper, painter—and a darned good boss.

HERE's a 10.00 x 22 synthetic that didn't give very good results. It's reported to have gone less than 10,000 mi. on a front wheel, blowing out at 40 mph. Note that a hammer handle is used to hold open the break in carcass.

In this "major" engine overhaul (240,000 miles), the crankshaft and camshaft are removed from the block, and the camshaft bearing sleeves are then pulled. Then the block is next boiled out in a hot cleaning solution (of popular make) of the alkaline type. This removes all sludge, grease, gum and other deposits, including any mineral deposits in the water-jackets. Then steam is used to complete the job of cleaning.

At this "major" overhaul, we replace all camshafts with new ones. While it may be found satisfactory to rebuild the camshaft journals, we do not believe that it is now a necessary or economical policy to try to rebuild the cams for further use, and at this point we feel that our camshafts are ready for junking.

At this time we have our crankshafts ground for undersize bearings, should they be .004" or more out-of-round. We have found this point of wear to be about the limit of wear that can be allowed in the crankshaft; otherwise it will have a serious effect on the bearings. At one time we would have the shaft built-up by metal-spraying and then reground for standard bearings, but we encountered a number of failures of the metal, so we discontinued this practice, in favor of regrinding the crankshaft and using undersize bearings.

Cylinder liners are rebored, when possible, and are fitted with new, oversize pistons, complete with pins, bushings and rings. New bearing inserts are used throughout at this "major" overhaul and the camshafts also get new bushings. Particular care is used in re-assembling the engine, to insure that the openings for the cooling water will match those in the cylinder block and head.

At the time of this "major" overhaul, all valves are first checked for stem size. Those showing excessive wear are replaced with new ones and new valve-guides are pressed into place. The hard metal valve-seat inserts are also renewed at this time, and new ones substituted, should previous grindings have deepened and widened them beyond proper valve seating.

And what about the chassis, you may ask? So far, we have paid lots of attention to the Diesel engines. For protection, as well as appearance at this time, each chassis is stripped of all working parts. Scale and rust—and old paint—are removed with steel brushes, after which the frame is repainted with our standard color—"fire-engine red". For this we are using a synthetic enamel of popular make, thinned with a suitable clear, and applied in the usual manner with a spray gun. It is interesting to note that the writer has found sufficient time, among his many other duties, to do all chassis and tank painting himself, as one of the pictures on the first page of this article will testify.

It goes without saying, of course, that before any of the stripped chassis working parts or units are replaced, they are thoroughly inspected, cleaned, lubricated, tightened and overhauled, if necessary. All of this work, too, is done in our own shops. Much of this work is simply routine overhauling, which may not be found exactly interesting to fleet operators who are doing it every day, so we will skip the details and devote the balance of this article to some high-spots of our operation and maintenance practices which, we believe, may be found of more pertinent interest to fleet men at this time.

In operating our vehicles, for example, our drivers have been taught to observe the hard-and-fast rule that the engine jacket water temperature must reach

(*Please turn to page* 68)

HORSEPOWER SWINGS INTO ACTION!

CASITE

GIVES QUICK STARTING EVEN IN COLDEST WINTER WEATHER

● Just a touch of the starter and—ZOOM—motors start *right now*, with Casite in the crankcase. Casite retards congealing of oil . . . lets engines spin over rapidly . . . gives fast, battery-saving starts, no matter how cold. Meet those heavy schedules. Put Casite in every motor now!

For passenger cars and small trucks, a pint in the crankcase every oil change, or every 1000 miles. For larger units and Diesels—10% of crankcase capacity.

WHAT CASITE DOES

ALL THE TIME—

- Reduces formation of sludge and gum.
- Frees sticking valves and rings.
- Carries oil to close tolerance areas.

AND IN WINTER—

- Retards congealing of oil.
- Gives quick starting, even below zero.
- Speeds up lubrication on cold starts.

THE CASITE CORPORATION · HASTINGS, MICHIGAN

CASITE GIVES BETTER AND SMOOTHER PERFORMANCE ALL-YEAR-ROUND

160 degrees F. before the unit is started off on its run. This rule applies on *any* run, at any time, and any place where the truck and its trailer may start from, *without* exception.

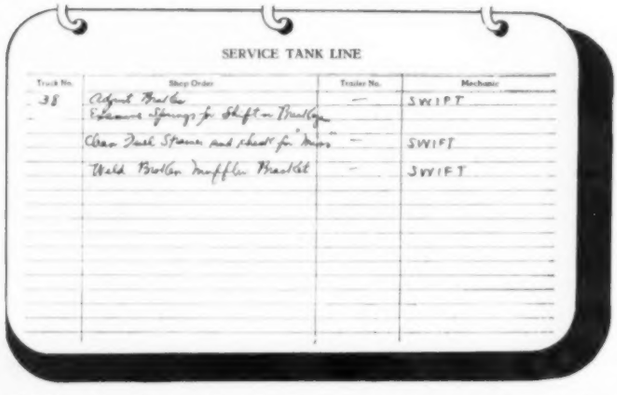
In order to reduce the time consumed in warming-up our engines, as well as to assist in fuel conservation, all trucks in this fleet are equipped with heavy canvas shutters (or shades) mounted in front of the radiator at the bottom. These canvas shades are mounted on spring rollers. From a ring in the center of the "shade-stick", a heavy cord leads back through a hole drilled in the top of the radiator shell (above the core) and is run over small pulleys to the cab.

By means of this simple device, the driver can raise or lower the shade to regulate the air flow to the core of the radiator, and at the same time, he can observe the temperature of the engine, indicated on the temperature gauge on the instrument panel. This device helps to get quick warm-up and precludes any "excuse" of taking a truck out before its engine is sufficiently warmed-up to our minimum of 160 degrees F.

We have also equipped all of our trucks with larger size standard-make transmissions, which have anti-friction bearings throughout. Previous to this change, we had considerable transmission gear trouble, possibly due to the reduction in nickel content of the gears (from 5 percent to 2 percent) during the era of substitute wartime parts. These new transmissions now give us no trouble.

In addition to our having two extra Diesel engines on hand, ready to slip into a chassis in the event of engine breakdown, we also make use of all available exchanges on transmissions and rear-ends. Incidentally, all of our trucks are equipped with regular and auxiliary transmissions, giving us virtually unlimited speed ranges.

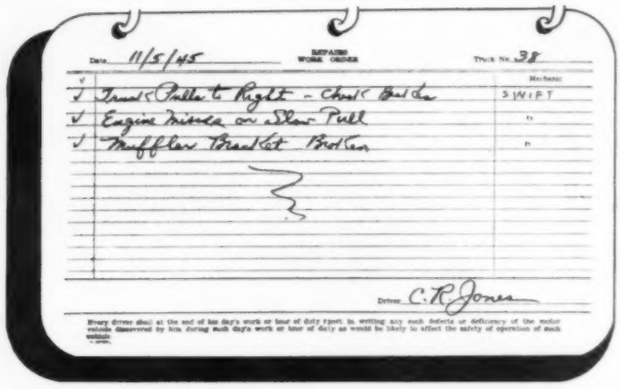
Since engine lubrication practice is always a subject of interest to fleet operators, here is what we do in this direction: Engine lube oil is changed at about 4,000-mile intervals. We also change oil-filter cartridges at the same time, on the average. We are now using an additive of popular make in our lubricating oil, in the proportion of one gallon of the additive to six gallons of lube oil—this only for breaking-in newly-overhauled engines. When thoroughly broken-in, we use a lesser proportion of additive of course.



SERVICE TANK LINE

Truck No.	Shop Order	Trailer No.	Mechanic
38	Adjust Brakes Remove Springs for Shift on Manifold	—	SWIFT
	Clean Dash Strainer and check for Leaks	—	SWIFT
	Weld Bracket Muffler Bracket	—	SWIFT

THIS is the shop work order form, used in conjunction with the driver's report shown above. Material used is listed on the back.



Date 11/5/45 — Repairs Work Order — Truck No. 38

✓		Mechanic
✓	Tract Pulls to Right - Check Brakes	SWIFT
✓	Engine Misses on Slow Pull	"
✓	Muffler Bracket Broken	"

Driver C. R. Jones

Every driver shall at the end of his day's work or hour of duty report in writing any such defects or deficiency of the motor vehicle observed by him during such days work or hour of duty as would be likely to affect the safety of operation of such vehicle.

EACH driver turns in a form (like this) to the foreman, listing the work to be done on the truck and trailer tanks in his care.

We also use about a half-gallon of this same additive in our fuel-tanks, which are of 165-gallon capacity. This has been found to be not only an excellent cleaner in general, but in addition, it helps to keep our fuel nozzles free of excessive carbon; and it also helps to maintain free action of valve stems and other upper-cylinder parts. This particular additive seems to have a similar action as another product of the same maker, which we use periodically for sludge removal.

Some time ago we followed the engine manufacturer's suggestion and changed all engine manifolds over to the larger (4-inch) size, for improved engine performance—which we now get. Our fuel pumps are set at the standard 32 cc. Wartime fuels gave fairly good performance at this setting, but seemed to result in more carbon. Our fuel mileage runs around four to five miles per gallon. Lube oil mileage, we approximate at about 780 miles to the gallon, with the larger lubricating oil pumps which have recently been installed on all of our engines.

Using a brake lining of popular make, our brakes average approximately 225,000 miles per set of lining, and more in certain specific cases. This lining is of the block type, ¾ x 6 inches, on 16-inch drums.

And what about our tire troubles, you ask? New tires (when we can get them) are first mounted on front wheels. After the first 10,000 miles, or breaking-in period, we usually switch them to driving wheels. Mileage on the initial (original) tread may run to about 30,000 miles, all told.

From our recaps—if the work is correctly done and good materials are used—we will average about the same mileage in this fleet. We use recaps only on driving wheels and the wheels of our trailers. The tire sizes we use are 10.00-20 on trailers and 10.00-22 on trucks. During the "tight" days of the war, we were sometimes forced to use the 20-inch tires on the front wheels of our trucks, because of the shortage of 22-inch tires. But we could *not* use them on driving wheels of trucks, because this would not only cause speedometer readings to go haywire, but it would also cut down the speed of the vehicles themselves.

We maintain our tire pressures religiously—at 80 pounds for the 22-inch tires, and 75 pounds for the 20-inch tires. We have found the new (wartime) syn-

(*Please turn to page* 146)

TRADE SECRETS

but you're welcome to them

...says MAYFLOWER

One of Mayflower's New Semi-Trailer Vans, Pulled by an International K-8.

Mayflower Dispatching Offices in New York, Indianapolis and Los Angeles control the movements of the hundreds of Mayflower vans operating in all the 48 states and Canada. This efficient dispatching system assures prompt service to Mayflower customers everywhere.

And what a great variety of jobs Mayflower handles! $130,000 worth of antiques being transferred from New York to Texas, a one-ton cheese being sent as a gift from Wisconsin to the White House, an art collection . . . these are only a few of the unusual loads Mayflower has carried, in addition to the home furnishings of innumerable families on the move.

MAYFLOWER SERVICE PLUS INTERNATIONAL SERVICE . . . . A WINNING COMBINATION

● Aero Mayflower Transit Company, nation-wide hauler of household goods, is one of America's smartest truck users.

Mayflower vans, controlled through Mayflower's efficient dispatching system, usually pick up a new load in the same town in which they unloaded the last . . . often keep continuously on the move for months before returning to their starting point. Do trucks stand up under such operation? Mayflower can give you the right answer, right from its books.

Mayflower has been buying Internationals since 1929 . . . and is still buying them. Some of its Internationals have had records of almost a million miles before being honorably retired from cross-country hauling.

Such rugged performance is a tribute not only to the outstanding quality of International Trucks but also to the expert servicing they receive . . . in Mayflower's own completely-equipped shops . . . and in the shops of International Branches and Truck Dealers.

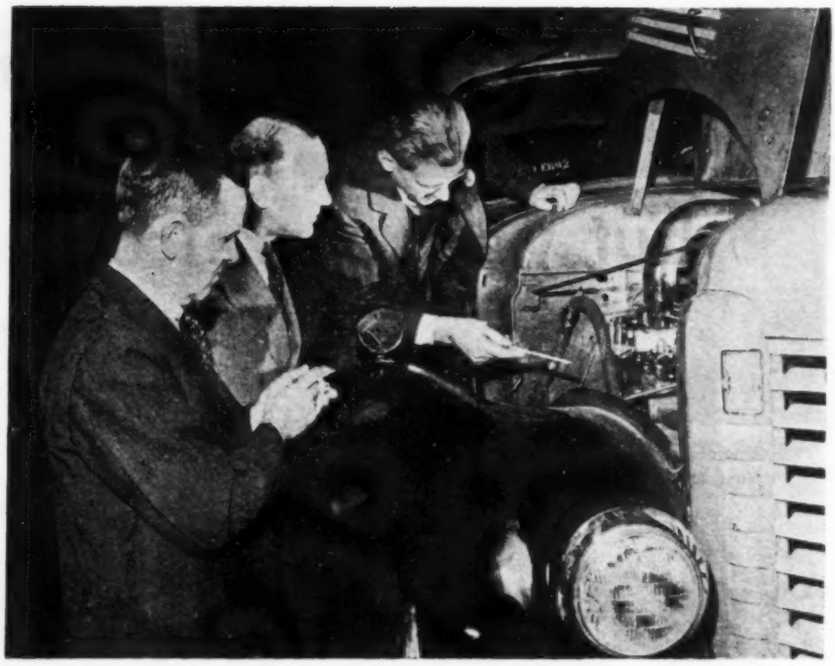
Wherever a Mayflower van may be operating, in any corner of the United States, it's always near an International Branch or Dealer ready to give day-or-night service. Mayflower service plus International Truck Service . . . it's the winning combination that keeps Mayflower's great fleet of Internationals rolling.

In fact, International Truck Service (the nation's largest company-owned truck service organization) is one of the many good reasons why truck users like Aero Mayflower Transit Company buy Internationals by the hundreds. One of the reasons why, for over fourteen years, civilian truckers have bought more heavy-duty Internationals than any other make.

INTERNATIONAL HARVESTER COMPANY
180 North Michigan Avenue • Chicago 1, Illinois

INTERNATIONAL

INTERNATIONAL *Trucks*



155 FLEET MEN REVEAL

MORE POST-WAR SUGGESTIONS, BASED on PRE-WAR

By H. Clay Fischer, Editor

THERE has been a lot of talk about motor vehicle engines of the future; how they will utilize new, lighter and stronger materials, and how they will "pack a bigger wallop" in a smaller package. Much of such speculation, if it is kept along these lines, seems to be within the limits of feasibility. But there are *other* characteristics of motor vehicle engines which fleet operators seem to desire, too. Some of them, perhaps, are "hold-over" features which have proved themselves in actual performance; others are just things which could have been there (but weren't), and do not necessarily smack of the new and revolutionary. So, we reasoned, let's see what the fleets really want!

As one of our surveys in the closing months of the war, we included in our Question-of-the-Month department, a questionnaire entitled *"What Do Fleet Owners Want in Engines for Post-War Vehicles?"*. . . . A total of 155 fleet operators responded to this questionnaire; they are located in 32 states and Canada and operate a total of 34,251 vehicles—an average of 221 vehicles per fleet; they are engaged in virtually all industries using fleets of motor vehicles, including trucks, tractors, buses and cars.

For ease of tabulation, we divided the replies among five different categories, based upon the *principal* vehicle type operated by each participating fleet. These tallied as follows: 73 of the fleets surveyed operate light trucks principally; 39 operate heavy trucks chiefly; 21 fleets are principally tractor-trailer users; 13 are bus operators; and 9 of these fleets are principal users of passenger-cars and taxicabs. (All 155 fleets, of course, operate other types of vehicles, too.)

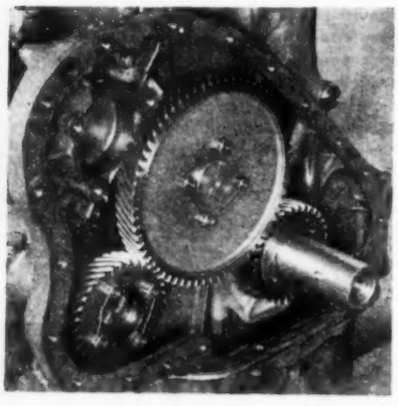
The next thing we did was to list the various engine types (based on currently-available, rather than promised-future) factors, characteristics and items of accessory equipment, in such a manner that it would be a simple thing to place check-marks alongside of those items which were desirable. It should be here pointed out that no attempt was made to get fleet men to "talk" about anything, except equipment with which they already had used and consequently were familiar with. We did not suggest, nor did we expect to get any "preferences" on such things as jet-propulsion engines, turbine types, atomic power and other subjects which probably make good reading, but do not provide any data which could be based on actual experience. In other words we stuck to the conventional, feeling that motor vehicle engines, as we know them, will continue to be used this year and the next—and maybe several more after that. So, let's see what we found out.

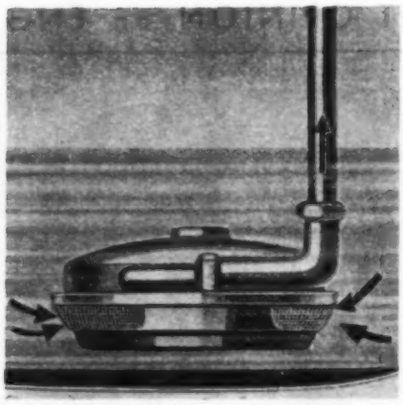
The following listings represent a tabulation of the various engine characteristics desired. There is a "composite" engine contained therein, for each of five different vehicle types. If your own line of thinking coincides with the majority of preferences expressed, then you can consider yourself "in the groove"; if it differs widely, maybe you are more progressive than the average; perhaps an idealist; or maybe just a stickler for your own particular operating requirements. We shall try to brief these data for easy reading, as follows:

ENGINES FOR LIGHT TRUCKS: Seventy-two of the light truck users indicated that they want gasoline engines. There were no votes cast for the Diesel for light trucks. Under the following subheads are tabulated the particular design and equipment characteristic preferences of the participating fleet men:

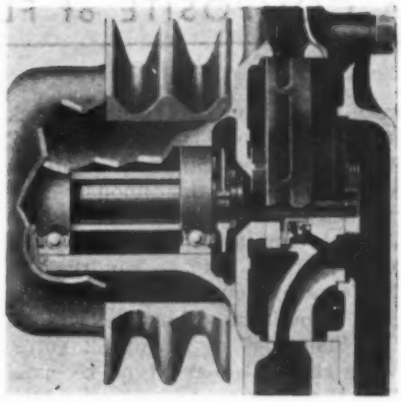
Number of Cylinders: For light trucks, 55 fleets asked for sixes; there were 9 votes for four-cylinder jobs, and 8 for eight-cylinder

GEARS are preferred for timing by most of the fleets surveyed, rather than chain.





THE floating type of oil intake screen received not quite half of the votes cast.



THE packless type water pump was a 6-to-1 favorite over the old style repack type.

HERE is a digest of another of our regular monthly fleet preference surveys. . . . It indicates, roughly, a composite of fleet-operator opinion on the general subject of truck, bus and passenger-car engine-design characteristics, accessories and related equipment.

ENGINE TYPE and EQUIPMENT WANTS . . .

AND WARTIME EXPERIENCES WITH VARIOUS ENGINES in FLEET OPERATION

engines; that is, gasoline engines.

Engine Type, Valves: The in-line type of engine got 63 votes; there were 8 cast for the V-type—presumably the same eight 8-cylinder advocates; and 1 operator suggested a radial-type engine. Under "valve arrangement", 37 asked for over-head valves and 35 preferred the L-head type; this is practically fifty-fifty.

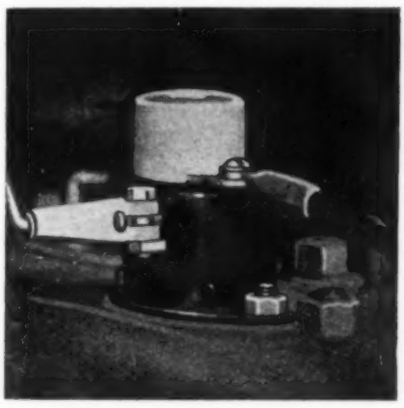
Cooling System: Fifty-seven of the light-truck users are satisfied to stick to water-cooling; an even dozen suggested air-cooling. For thermostats, 36 expressed a choice for the by-pass type, and 27 are satisfied with the ordinary type, without the by-pass. The packless-type of water pump got 55 votes, as against 8 for the old-fashioned, "pack-it-yourself" type. Cooling fans with solid, non-adjustable blades received 54 votes, while the new type of fan, with thermostatically-controlled, adjustable blades, received 16 votes—a rather large number, since relatively little is known of this type of fan, to-date.

Valve-Seats, Pistons, Sleeves: Most of the light truck users (45 to be exact) asked for valve-seat inserts on all valves; 21 suggested that these be used on the exhaust valve seats only; and 4 more said they would rather not have any inserts at all. The question of aluminum vs. iron pistons for light truck engines brought 39 votes for aluminum and 28 for iron. Cylinder-sleeves have been rare on light truck engines in the past; however 21 fleet men called for dry-type sleeves, 13 for the wet-type; and 31 were willing to do without sleeves on light truck engines.

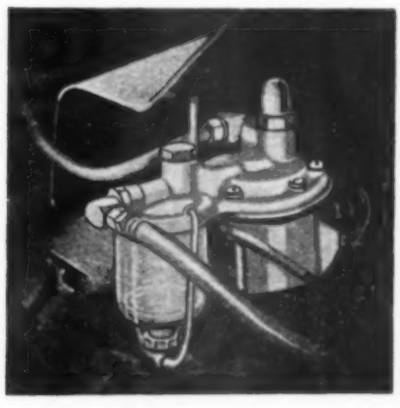
Lubrication System: "Pressure to all bearings" was the leader, with 55 votes, while "Pressure to Mains and Rods Only" got 15 votes; in other words, all of the light truck users who responded to this question want pressure lubrication of some kind. Oil-filters, you ask? But of course! All who answered this question suggested the "cartridge" type, the "large" type, etc., excepting one who said "Built-in type". The oil-gauge question seemed evenly divided, with 34 votes counted for the electric oil gauge and 33 for the old-fashioned hydraulic type. An automatic crankcase level indicator is something that has been talked about a lot in the past, but little has been done about it. When we asked if they

(Please turn to page 72)

ONE-third of the fleets surveyed asked for automatic chokes; this one is typical.



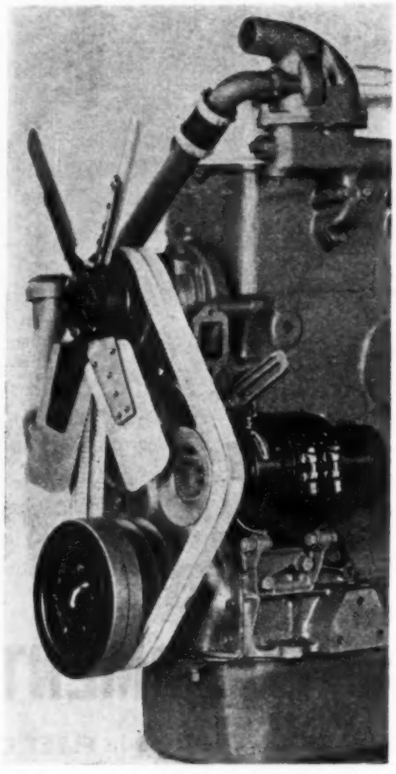
TWO-thirds of the fleets surveyed asked for the mechanical fuel pump as standard.



were wanted on future light truck engines, 53 votes were cast "for" it; only 8 were against it. Opinion was expressed unanimously for crankcase ventilation; frankly, we did not expect that anyone would go out of his way to say that he *didn't* want such a good thing. How about the oil-intake screen? The "floating" type got 32 votes, while the stationary type received 30. Just about 50-50 on oil-intake screen choice, and we'd guess that everyone would welcome a type that could be easily removed for cleaning and inspection, *without* taking the oil-pan down.

Fuel System: Beginning with the fuel-pump, we counted 51 votes for the mechanical type, and 18 for the electric. Down-draft carburetors were preferred by 57 of these light-truck users, while 7 seemed willing to stick to the up-draft type. The oil-bath air-cleaner got a great number of votes—60 to be exact, while the plain or wire-mesh type, without the oil-bath feature, received but 8. The question of automatic chokes revealed that 49 of these light truck users do *not* want them; 14, however, think they are just swell and would like to see them on all future engines.

Timing & Electrical: Gears were preferred by 49 of these light truck users, instead of timing chains, which only received 16 votes. Battery and distributor ignition got all of the votes, except one which was cast for magneto ignition. Preference on starter drives was somewhat indefinitely expressed, as follows: "Bendix-type"—12; "Clutch-type"—10; "Manual-type"—6; "Positive-type"—2. Spark plug sizes are always controversial; the votes on this question were largely



FOR the by-pass type thermostat, votes were 2-to-1 over the plain type. . . . Generators with voltage regulation carried a 12-to-1 margin over the third-brush type.

in favor of the 14-mm. size, which received 23 votes; the 18-mm. received 9 votes, as did the 10-mm. size. Five votes were cast for the ⅞" size, and 3 operators just said "Large size". Voltage-regulated generators got 65 votes, while only 8 were counted for the third-brush type.

Governors: Thirty, out of our 73 light truck users, checked governors as being desirable, 25 calling for the velocity type; 4 for the mechanical type; and 1 asked for the "wheel type"—whatever that is.

Air Compressor: Maybe a built-in air-compressor would be a good thing on truck engines? It could be used for operating air brakes, and also for inflating tires on the road; perhaps for other uses, too? Only 13 of the light truck users, however, checked this item as being desirable; 21 definitely said that they did not want one to be built-in as standard equipment.

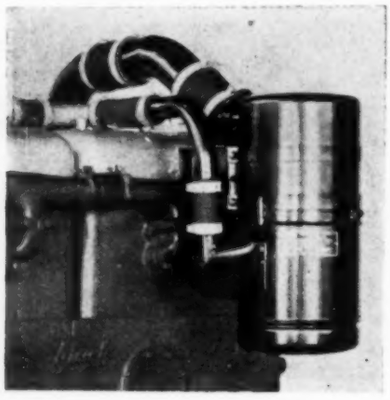
Above are the engine design, characteristics and accessories choices among the users of light trucks who participated in this survey. On many of the questionnaires returned, not all of the items were checked or filled-in. There were many blank spaces. No attempt has been made, therefore, to tabulate the "No Answers", nor to fill in types of equipment, even in cases where the type might have appeared (to us) obvious. Next we take up engines for heavy-duty trucks:

ENGINES FOR HEAVY TRUCKS: Of the 39 heavy truck users who participated, 37 expressed their choice for gasoline engines, while two votes were cast for Diesel engines. Under the following sub-heads are tabulated the particular design and equipment characteristic preferences of the participating fleets:

Number of Cylinders: For heavy trucks, 37 fleets asked for sixes; there were only two votes cast for 8-cylinder jobs.

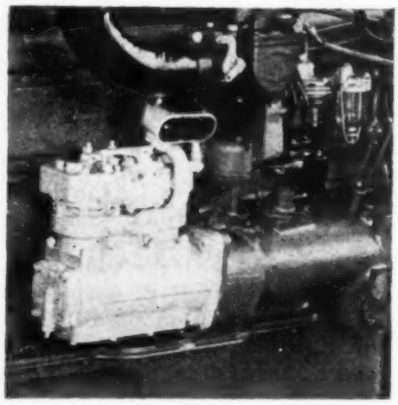
Engine Type, Valves: The in-line type of engine got 37 votes; there were 2 cast for the V-type—presumably the same 8-cylinder advocates. Under "valve arrangement" 23 asked for over-head valves and 16 preferred the L-head type. (*Please turn to page* 182)

THE vote on air-cleaners was definitely in favor of the big size, oil-bath type.



OIL filters are wanted, of course. The standard "cartridge" type seems quite ok.

THE number of fleets asking for built-in air-compressors was surprisingly large.



No "Buts" about this Amazing New Oil Filter . . .

You've heard it said often, no doubt, "Oil Filters are all right, *but* . . ." Now it's time you got acquainted with the oil filter that ends all "buts"—the new Fram Filcron Oil & Motor Cleaner, which contains that amazing new filtering element, the Fram Filcron cartridge. Tested and proved in world-wide service with both Army and Navy, it offers these advantages:

1. Micronic Filtration: The new Fram Filcron filter and cartridge make possible "micronic filtration," the trapping of abrasive particles as small as one micron (.000039 of an inch) in size. This keeps oil physically, *visually* clean, reduces engine wear to a minimum, saves overhauls, repairs, money. Filcron cartridges are available to fit any Fram filter, present or prewar.

2. Greater Efficiency: Fram Filcron filter and cartridge have a higher clean oil flow rate, and oil is cleaned at one pass.

3. Advanced Design: Bodies and covers of the new Fram Filcron filters are made of heavy, one-piece pressed steel, solidly built to give years of service. New reinforced bottom greatly increases strength. Drain and inlet spuds insure leak-proof connections. The new Fram Filcron cartridge has pull out bale attached to bottom plate.

4. Long Life: Greater dirt capacity means longer cartridge life, thus reducing operating costs.

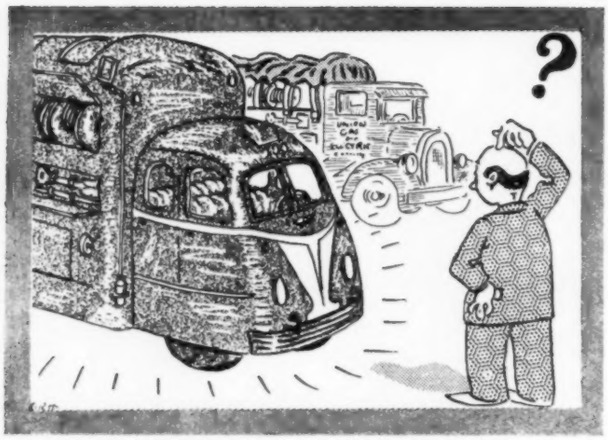
5. Proven Superiority: Developed for the Armed Services, millions of Filcron cartridges have proved their outstanding qualities with the Army on the battlefields of the world and with the Navy on every ocean.

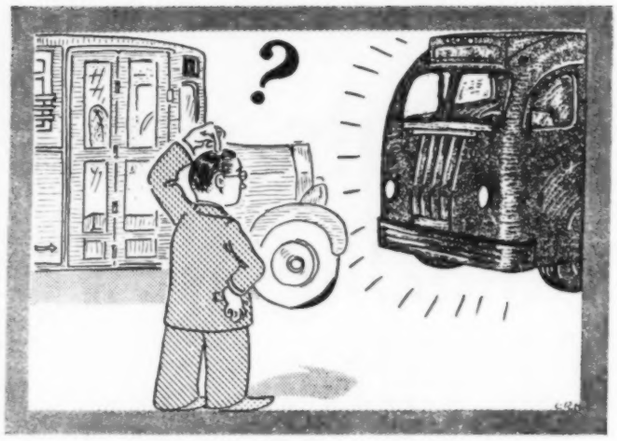
6. Money - Back Guarantee: Try the new Fram Filcron filters and the Fram Filcron cartridges on your fleet. You won't risk a penny, because if, within 90 days, you feel you can afford to operate without Fram, your money will be cheerfully refunded. *Ask your distributor about the new Fram Filcrons today!* Fram Corporation, Providence 16, R. I. *In Canada:* J. C. Adams Co., Ltd., Toronto.

HOW'S YOUR OIL FILTER? ***The Dipstick Tells the Story!***

FRAM *Filcron*

THE MODERN OIL FILTER





WHEN SHOULD VEHICLES BE RETIRED?

S.A.E. MEMBERS HEAR FOUR PROMINENT FLEET EXECUTIVES GIVE THEIR OWN

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"Actual Wear Standards Are Needed"

By Don K. Wilson

Supt. Automotive Equipment,
New York Power & Light Corporation

BROADLY speaking, when considering the retirement of vehicles, such retirements fall into two general classifications. These are as follows:

First: Retirements due to vehicle obsolescence. In these cases, changed operating conditions have made the purchase of a new vehicle imperative, or, possibly, the manufacturer has brought out a new model incorporating sufficient improvements to warrant its immediate purchase. . . . *Second:* Routine replacements of any given vehicle by an identical or similar type.

The first type of retirement is one that may be evaluated and handled relatively easily. It is forced retirement brought about by changing conditions.

It would appear that we are primarily concerned, in this discussion, with the second, or routine type of retirement. Consideration of this class of retirement is compounded of many factors. Some of these factors are as follows: (a) Depreciation policy. (b) Operating conditions. (c) Maintenance policy. (d) Concentration of fleet, geographically. (e) Market conditions for new and used vehicles. (f) Mechanical condition of the vehicle itself. . . . Let us briefly consider each of these factors.

Depreciation: There are two definitions of the word depreciate; one, "to lessen in value," the other, "to disparage." I am afraid that our depreciation policy, in too many cases, becomes a disparagement policy. We all, personally, and as company representatives, have a natural, normal desire to operate new equipment. This desire frequently colors our thinking to an undue degree.

The public utility industry, generally, has been slower to replace vehicles than many others, and its depreciation policy has (*Please turn to page* 144)

•

"Maintenance Is Not a Criterion"

By W. A. Taussig

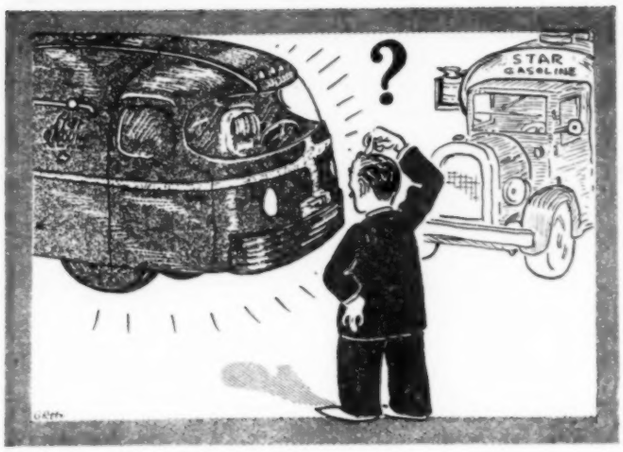
Automotive Engineer,
Burlington Transportation Company

THE subject assigned to me for this discussion was depreciation of buses. If I have the correct interpretation of this term, it is an accounting procedure to eliminate or minimize the shock of being required to suddenly make a capital outlay, when it is determined to replace the old bus with a new one. In other words, it is a self-imposed savings bank, that also assists management in estimating currently its profits or losses. Without setting up an estimate for depreciation, management would be obliged to wait until the vehicles are actually retired, before the total cost of owning and operating them could be ascertained.

It appears to me that we are more interested in determining when to retire a bus from service, than we are in the estimate set up by our accounting departments. The title of this discussion is therefore, "Retirement."

To determine when a bus should be retired always requires "judgment" (term used by executives to denote a guess). The problem, stripped of all it's trimmings, resolves itself into the simple question, "Will the company prosper more or less if we replace the dear old clunker with a bus that is new, snappy, attractive and perhaps more economical to operate?" The answers cannot be stated as simply as can the question.

The selection of motor vehicles for transporting passengers is an entirely different problem than that for the transportation of freight. I don't believe anyone will question the fact that the primary task of management in freight transportation is to secure the lowest possible ton-mile operating cost consistent with safe, fast, reliable operation. The shipper does not care what kind of a vehicle (*Please turn to page* 144)



--A SYMPOSIUM

VIEWS on VEHICLE DEPRECIATION

HERE are four papers, presented at the Annual Meeting of the SAE in Detroit last month, on the subject of Vehicle Depreciation. All four authors are nationally-known fleet operators.

"Never 'Wear Out' With Good P.M."

By G. W. Laurie
Automotive Engineer,
The Atlantic Refining Company

MANY formulas have been developed that can be used as a general guide to a retirement policy, the most prevalent in use, concerning the relative depreciation of the vehicle compared to maintenance costs. But as most of these formulas have as a basis one or more assumptions, none of the formulas, up to the present time, can stand up under practical criticism.

The one common assumption dealt with in most all formulas is depreciation. It is assumed that in some cases depreciation would be effected over a period of possibly two, to as many as ten or twelve years. The complete depreciation of a piece of equipment within two years would seem as ridiculous to some as depreciation of a piece of equipment over a twelve-year period to others.

For the purpose of this discussion, I will confine my remarks to that phase of the subject dealing with heavy-duty equipment, for the reason that our operation is predominantly in that classification group. With the exception of those lighter units as used in local delivery service, most of the hauling of our petroleum products is performed by trucks designed to utlilize the maximum gross vehicle weight permitted in the various states where we operate. We are dealing, therefore, with capital investments of from $5,000 to $14,000 per vehicle.

It has been our experience that, where such a fleet of trucks is operated on a preventive maintenance basis, there is little justification for replacement of equipment other than obsolescence, changes in state weight regulation where the truck operates, and accident.

Under the heading of (*Please turn to page* 158)

"Methods of Depreciation Vary Widely"

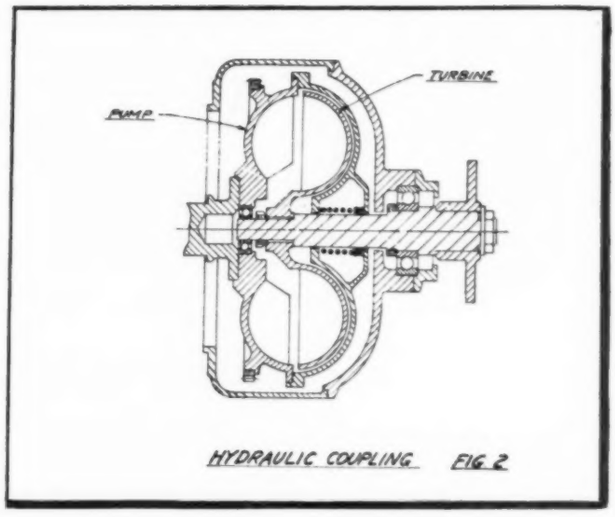
By H. L. Willett, Jr.
Vice-President
The Willett Company

WE proceed on the theory that what depreciation is supposed to do for a piece of automotive, or any other equipment, is to write it off so that when the vehicle is ready for replacement, you have your original investment returned. If the method of depreciation is accurate, you will come out even. However, operating conditions vary greatly and a depreciation method that would get you your money back from one operation would not necessarily suffice for another.

Our company is a sort of department store of trucking and we have all kinds of operations; city and country, low mileage and high mileage, easy and severe. We depreciate the truck, the tires, and the body, if detachable, separately and according to usage. We consider depreciation as a fixed weekly or yearly charge, based on a number of factors, such as high maintenance after a certain mileage, obsolescence and so on. . . . Every vehicle is judged on its own merits and the following procedure is used:

Depreciation is set on every vehicle by a committee consisting of the Treasurer, the General Manager (which is the Operating Department) and the head of the Maintenance Department.

The Treasurer of the Company is the head of the committee. He sets up the rates which provide that the Company gets its money back from the investment in the truck. The Operating Department analyzes the problem of the use of the truck, and provides the information as to how far it will operate, etc. The Maintenance Department then estimates how many miles the vehicle can operate at a fixed cost of maintenance per mile under those conditions set forth, or the "useful life" of the vehicle, before high maintenance sets in. The Treasurer who (*Please turn to page* 162)



HYDRAULIC COUPLING FIG. 2

AN INTRODUCTION to

WHITE ENGINEER GAVE S.A.E. MEN THIS

IN announcing White's new "Hydro-Torque Drive", Engineer Brunken reveals the basic differences between hydraulic couplings (fluid drive) and torque-converters. . . . The White drive is a combination of both and will be discussed in a later issue.—Ed.

THE hydraulic coupling, as well as the hydraulic torque-converter, are not new devices. They were invented back in 1905. In spite of the many advantages of the hydraulic torque-converter, its introduction to automotive applications has been rather slow. The reason is that it was difficult to obtain proper characteristics, especially if it was desired not only to start the vehicle through the torque converter but, also, to stay in hydraulic drive throughout all speed ranges. For a better understanding of the White Hydro-Torque Drive, however, a review of these hydraulic units may be in order. (Data on the White drive will appear in a subsequent issue.—*Editor*).

The most efficient means of transmitting power at different speed ratios is, and was, of course, the multiple-step gear and chain; it has been impossible to make any other device which is more efficient; but this does not necessarily imply that it is the most economical means in applications where a great variation in speed and torque is required, as in automotive vehicles, driven by internal-combustion engines, where the load has to be accelerated from a standstill, and moved over varying road conditions.

In many instances, it is possible to move a certain load, at a certain speed, over a certain distance, equally, or more ecomomically, by means of an automatic transmission, which has an apparent lower specific efficiency than the mechanical gear-box. This, of course, requires an accurate synchronization of the transmission characteristics to the engine horsepower output, and to the vehicle torque needs.

Hydraulic Couplings: Figure 1 shows the efficiency curve of a hydraulic coupling and is plotted over the speed ratio, the latter being the quotient of output speed over input speed, or turbine r.p.m. divided by pump r.p.m. The efficiency starts at "O" and rises in a straight line until it almost attains 100%, and then drops off sharply to "O". A hydraulic coupling is what the name implies, namely, a clutch in which the input torque will always equal the output torque.

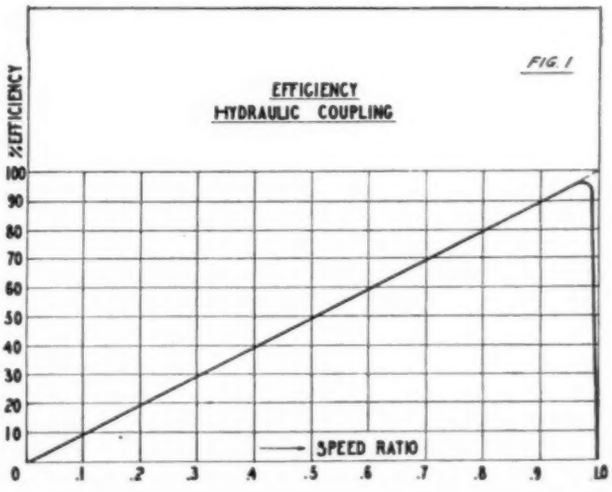
For this reason, if a hydraulic coupling is utilized in a transmission, it is necessary to use the same number of reduction-gear steps as would be required in connection with a mechanical friction clutch. One advantage of the hydraulic coupling over a mechanical friction clutch is the fact that the engine is permitted to come to a higher speed at starting. Furthermore, of course, the hydraulic coupling eliminates shocks and, therefore, is invaluable in protecting the running-gear of the vehicle.

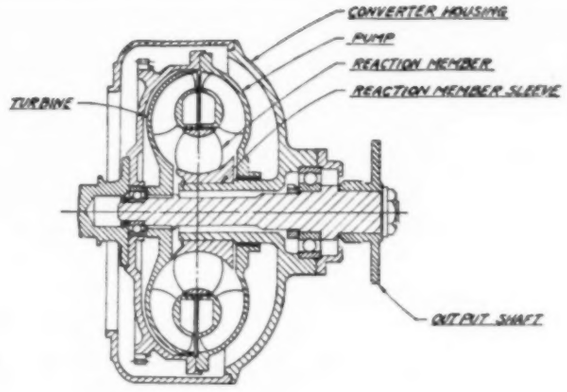
The hydraulic coupling in its simplest form consists of two major functional parts, namely, the pump which is attached to and driven by the engine, and the turbine which is mounted opposite the pump and attached to the output shaft and driven through the medium of oil by means of the pump. (See Figure 2 at top of page.)

Hydraulic Torque-Converters: In contrast to this, Figure 3 shows the efficiency curve of a hydraulic torque-converter and is presented in the same manner, namely, over the speed ratio. The curve behaves quite differently from that of the hydraulic coupling. It also starts at "O" but then rises above that of the hydraulic coupling curve to a maximum and then gradually drops off to "O".

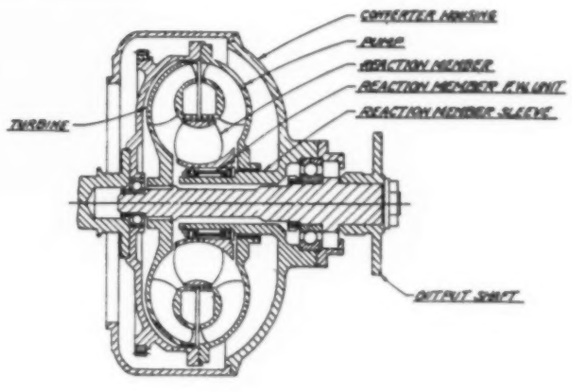
The torque ratio curve also is shown and instead of being constant, as it is for the hydraulic coupling, this curve starts with a maximum at "O" speed ratio, decreases to a point where the torque ratio is 1:1, and from then on drops to "O". The point where the torque ratio is 1:1 is called the clutch point, because the converter at this point is acting as a hydraulic coupling or clutch, inasmuch as the input torque is equal to the output torque. The efficiency at this clutch point is equal to the speed ratio at which the clutch point occurs.

The construction of a torque-converter in its simplest form is very similar to that of a hydraulic





TORQUE CONVERTER FIG. 4.



CONVERTER-COUPLING COMBINATION FIG. 5.

HYDRAULIC DRIVES, TORQUE-CONVERTERS

INTERESTING DISCUSSION AT ANNUAL S.A.E. MEETING, HELD IN DETROIT RECENTLY

By R. Brunken

Transmission Engineer,
The White Motor Company
Cleveland, Ohio.

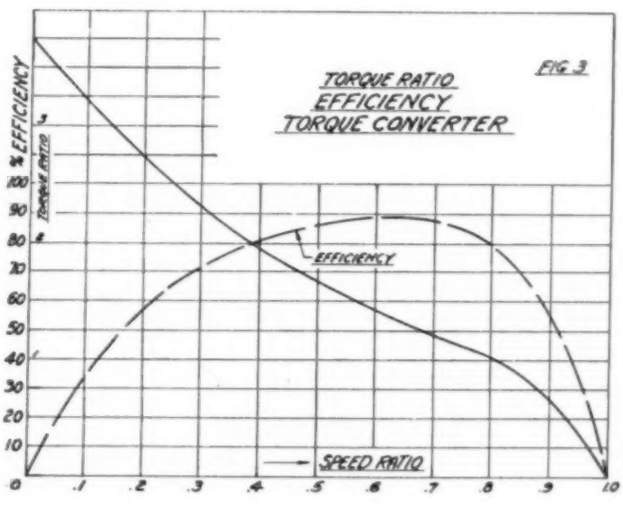
coupling; however, instead of having two fundamental functional parts, the hydraulic torque converter has a minimum of three. The additional part is the reaction member, which is mounted intermediate the pump and turbine, and serves as a fulcrum point to make the torque increase possible.

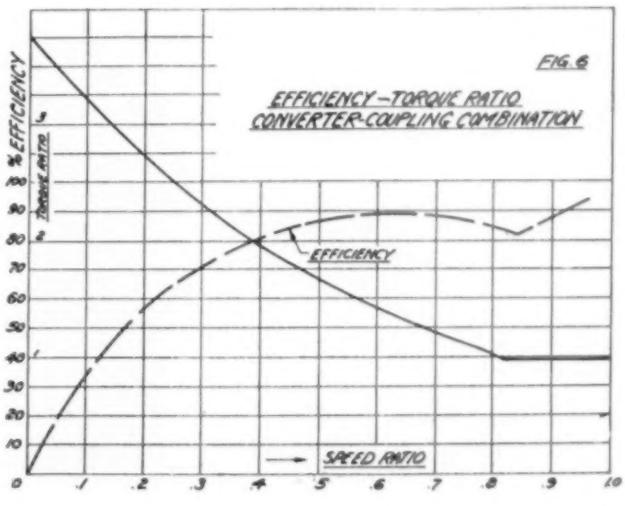
In this type of torque-converter, the reaction member is mounted stationary on the converter housing by means of an extension or a reaction member sleeve, which reaches into the converter proper, as shown in Figure 4. The torque-converter in itself is an automatic transmission, changing torque and speed ratios in infinite numbers of variations inherently according to the torque requirements.

Combination Coupling-Converter: An analysis of these efficiency curves shows that the hydraulic torque-converter, as well as the hydraulic coupling, have their disadvantages. The hydraulic coupling efficiency at lower speed ratios is extremely low, and for that reason a vehicle equipped with a hydraulic coupling has to be designed in such a manner that for practical purposes the hydraulic coupling will not be operated at the lower speed ratios, except while starting the vehicle.

The torque-converter has a much better efficiency at these low speed ratios because it gives torque conversion during same. However, the efficiency of the torque-converter decreases after attaining its peak, and drops rapidly from the clutch point. For this

(*Please turn to page* 150)





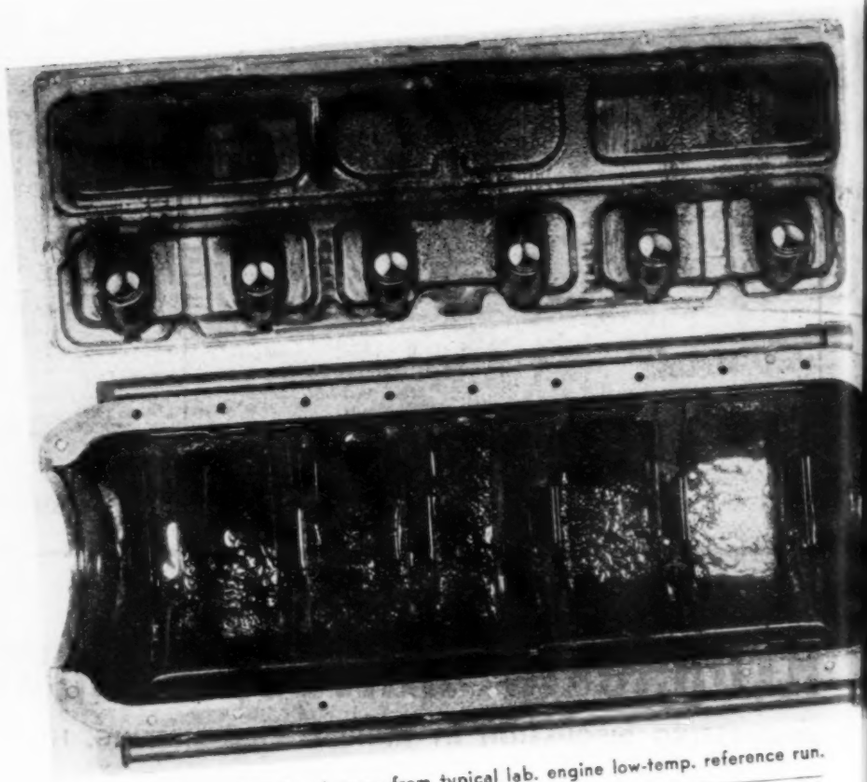


FIG. 5—Oil pan and push rod cover from typical lab. engine low-temp. reference run.

SOME FURTHER STUDIES on

THIS article brings you up-to-date on the general subject of low-temperature sludge. It's a further elaboration on an article on the same subject, which appeared in our February issue of last year.—Editor.

THE general subject of low temperature sludge in automotive gasoline engines was discussed in the February 1945 issue of this publication. Numerous advancements have been made since that time, and it is the purpose of this article to present the latest developments on this subject.

The problem of sludge in gasoline engines is almost as old as the engine itself. Two types of sludge have been recognized for many years; that associated with high temperature operation and attendant oxidation of the lubricating oil, and that associated with low temperature operation wherein the so-called mayonnaise or emulsion-type deposit is developed. Although such difficulties have prevailed in automotive equipment for many years, restrictions imposed by wartime regulations along with inadequate maintenance personnel, shortage of replacement parts, heavier schedules and other operational obstacles, have collectively aggravated the formation of sludge and focussed attention on this problem.

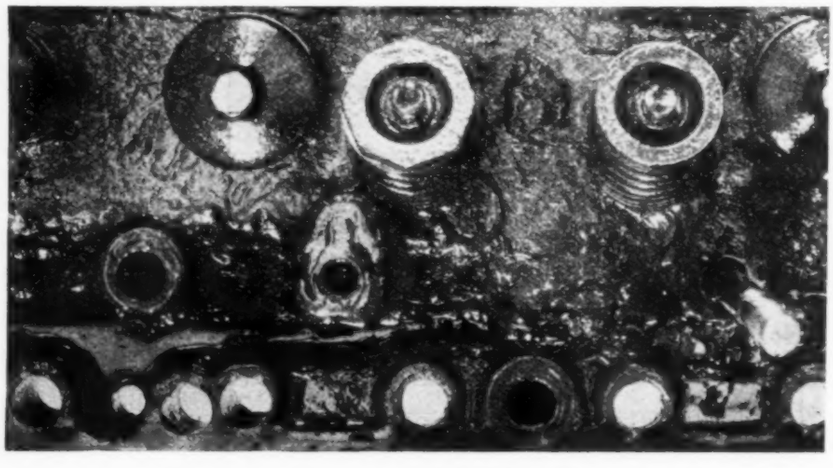
Extensive investigations have been carried out toward minimizing engine deposits and oil oxidation occurring under high temperature operating conditions; solution through the use of heavy-duty oils has been generally satisfactory. Low temperature operations have not received this comprehensive attention and thus many operators have suffered as a result of engine deposits from operating conditions normally considered to be mild. As will be discussed later, however, these "mild" conditions are actually more severe in some respects than many high temperature operations.

Laboratory engine tests have been developed to simulate low temperature service conditions and have been employed in a comprehensive study of the low temperature sludge problem. Much of the information to be presented subsequently has been obtained from these laboratory investigations. The operating conditions employed in this test procedure will be discussed later.

NATURE AND METHOD OF FORMATION — *Deposit Analyses:* It is often difficult to determine the cause of engine deposits from their analyses alone, since most service operations involve both low and high temperature conditions.

Examination of deposits from laboratory engines known to have operated exclusively under low temperature conditions shows that, on an oil-free basis, they are composed primarily of fuel diluent, water, and free mineral matter (lead compounds from fuel combustion, and iron and other metals occasioned by engine wear and rusting), along with lesser quantities of carbonaceous material and oxidation products. An analysis of such deposits is shown in Table I, along with similar analysis from service operations. The latter case demon-

FIG. 6—Valve chamber from typical laboratory engine low temperature reference run.



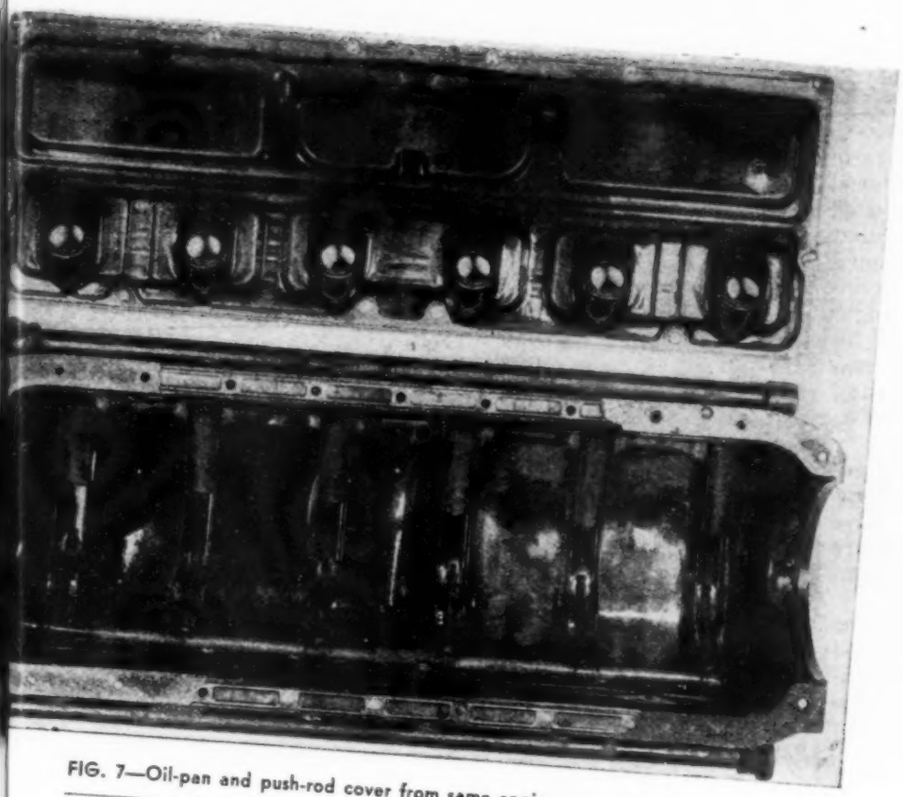


FIG. 7—Oil-pan and push-rod cover from same engine, run under improved conditions.

LOW TEMPERATURE SLUDGE

By R. S. Wetmiller and E. J. Bowhay,

Technical and Research Division,
The Texas Company, New York, N. Y.

strates the difficulty of identifying low temperature deposits and recommending corrective measures on the basis of deposit analysis alone. This is due to the fact that most service operations are conducted with high temperatures prevailing during some portion of the operation, thereby baking existing deposits and supplementing them with oil oxidation products.

Used Oil Characteristics: Used oil from both low and high temperature operation often exhibits a high neutralization number. In the first case oil deterioration is negligible and the high neutralization number is associated with the oil insolubles originating from the combustion chamber; in the latter case, the high neutralization number results from oxidation of the lubricating oil.

Extended low temperature operation is reflected in unusual characteristics of the used oil which differ from those resulting from high temperature operation as shown in Table II. In the case of low temperature operation, it will be noted that the neutralization number is relatively high, thus suggesting that extensive oil oxidation had occurred. However, from exhaustive laboratory tests, it is known that negligible oil deterioration occurs at the low temperatures employed (as evidenced by low percentage of oil soluble oxidation products) indicating that the high neutralization number resulted from material originating from some other source. The amount of oil insolubles, consisting of incomplete combustion residues, is also high. After clarification (removal of insolubles) the neutralization number is greatly decreased, indicating that the material responsible for this high value is associated with these insolubles. This is further substantiated by the very high neutralization number of the insolubles, themselves.

In the case of high temperature operation, it will be noted that the neutralization number is also high. Since the oil soluble oxidation products have a very high neutralization number and are present in large quantity, it is evident that most of the material contributing to the high neutralization number originates from oxidation of the lubricating oil. Removal of the oil insolubles, which are present in minor quantities, by clarification reduces the neutralization number only slightly, it remaining relatively high due to the presence of the soluble oxidation products.

The foregoing discussion is demonstrated by Figure 1, which shows that for low temperature operation, the neutralization number is associated with oil insolubles originating from combustion residues, while for high temperature operation, it is associated with oil soluble oxidation products resulting from deterioration of the lubricating oil itself.

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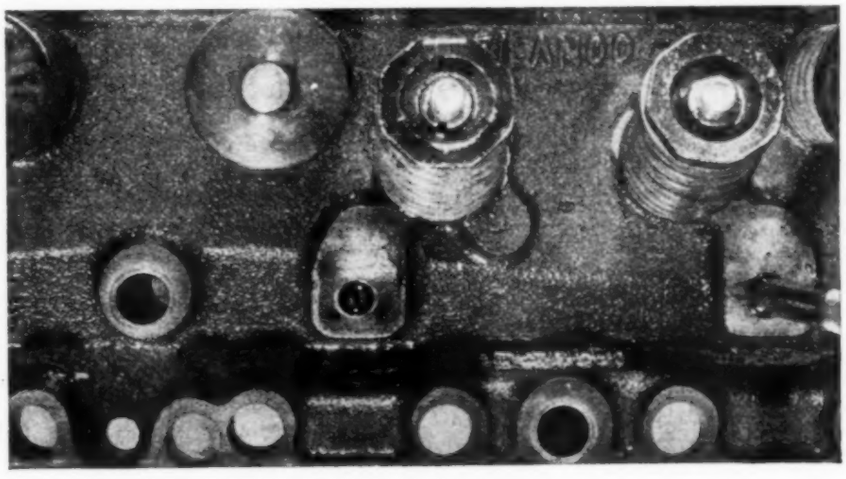
FIG. 8—Valve chamber from laboratory engine test run using improved operating conditions.



Additional information in regard to origin and distribution of the neutralizable material causing the neutralization number in used oil is shown in Table III. It is apparent that in the case of low temperature operation a majority of the material is water soluble, indicating it to be of low molecular weight and evidently originating from the fuel. With high temperature operation, however, the material is largely water insoluble, indicating high molecular weight with oil oxidation as its source.

It is significant that the nature of the neutralizable materials formed in low temperature operation has not been found corrosive to "alloy" bearings, while in high temperature service, these materials are generally corrosive.

Engine Deposits vs. Oil Insolubles: The amount of oil insoluble materials produced with a given fuel under any set of low temperature operating conditions is approximately constant. The relative amount of these materials deposited on the engine parts or remaining in the oil, to be drained at the oil-change period, depends upon the ability of the oil to retain them in suspension.

It was previously pointed out that with low temperature operation, contaminants from the combustion chamber evidence themselves as insoluble material in the lubricating oil and as deposits on various engine parts. Experience has shown that most of the deposits accumulate in the oil pan and valve compartments; oil ring and piston skirt deposits are small in comparison. The latter, however, are considered to be very important since they contribute directly to poor oil control, spark plug fouling and piston seizure.

It is not difficult to determine quantitatively deposits present on piston skirts, in oil rings and on oil pan and cover plate surfaces. In fact, such determinations are made on nearly all laboratory engine tests. Figure 2 is a plot of results from low temperature laboratory engine tests showing the relationships between oil insolubles and the above mentioned deposits which are normally measured. It will be noted that as oil insolubles increase, engine deposits decrease. From the intercepts of these curves it appears that when engine deposits become zero, so that all contaminants are in the oil, an oil insoluble content somewhere between 3.9 and 4.8% (average 4.3%) would result. Basis this average value and a normal oil drain of 4 quarts (3178 grams), an average total oil insoluble content of 137 grams is determined. As a check on this line of reasoning, ten runs were made and deposits carefully determined for all engine parts. Average results of these tests are shown in Table IV, compared with values predicted from Figure 2 as outlined above; the agreement is remarkably good.

TABLE I
TYPICAL ENGINE DEPOSIT ANALYSES

Deposit Components (Oil-free basis)	*Average from Low Temperature Laboratory Engine Tests*	*Typical Field Sample*
Diluent, %	20.3	14.8
Water, %	51.5	9.1
Oxidation Products, %	8.2	34.2
Free Carbon and Carbonaceous, %	3.7	21.7
Free Mineral Matter, %	16.3	20.2
Total %	100.0	100.0

TABLE II
TYPICAL USED OIL ANALYSES

		Following Low Temperature Operation		*Following High Temperature Operation*	
	New Oil	*As Drained*	*After Clarification*	*As Drained*	*After Clarification*
Neutralization Number	0.06	4.7	1.2	5.2	3.9
Dilution, %	0	15.8	15.8	0	0
Oil Insolubles, %	0	2.07	0	1.16	0
Oil Soluble Oxidation Products, %	0	0.20	0.20	3.09	3.09
Neut. No. on Oil Insolubles	..	17.2	..	28.8	..
Neut. No. on Sol. Ox. Prod.	..	..*	..*	63.2	63.2

*Quantity of oxidation products insufficient for analysis.

TABLE III
DISTRIBUTION OF NEUTRALIZABLE MATERIAL IN USED OIL

Per cent of Total Neutralizable Material Soluble in:	*Low Temperature Operation*	*High Temperature Operation*
Diluent	5	0
Water	58	17
Residual Oil*	37	83

*Diluent and water-free but containing insolubles and soluble oxidation products.

TABLE IV
DISTRIBUTION OF ENGINE DEPOSITS

	Predicted From Figure 2	*Average of 10 Runs*
Oil Insolubles, per cent	1.72	1.72
Total Oil Insolubles, grams	54.8*	57.4
Piston Skirt Deposits, grams	1.2	1.3
Oil Ring Deposits, grams	1.8	1.7
Oil Pan and Cover Plate Deposits, grams	31.0	27.8
Block, Valve Compartment and All Other Parts Deposits, grams	48.2**	38.3
Total Engine Deposits + Oil Insolubles, grams	137.0	126.5

*Basis 4 quarts (3178 grams) oil drained $\frac{3178 \times 1.72}{100} = 54.8$.

**By difference.

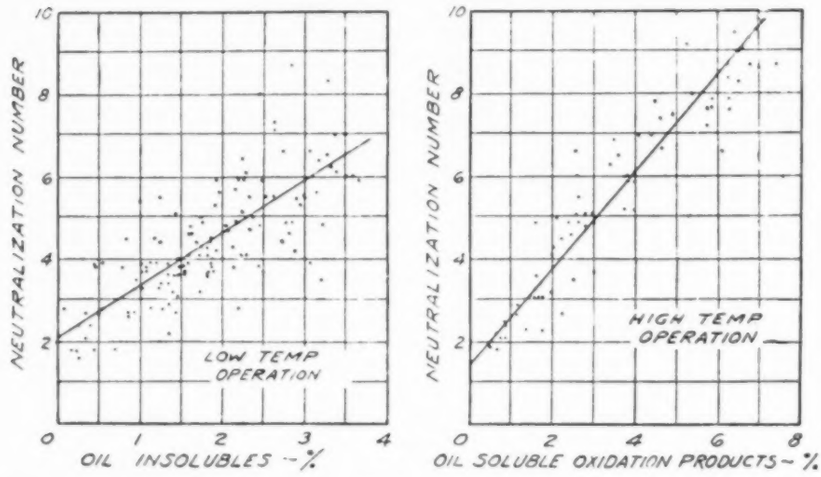


FIG. 1—The relation of used oil characteristics in low and high temperature operation.

Corrective Measures: Low temperature sludge can be alleviated by employing heavy-duty oils and by altering operating techniques.

It is evident from the foregoing discussion that low temperature sludge is largely the result of contaminating the lubricating oil with extraneous matter originating from incomplete combustion of the fuel oxidation products. Since the oil itself is not oxidized or otherwise altered to any appreciable extent, it is not

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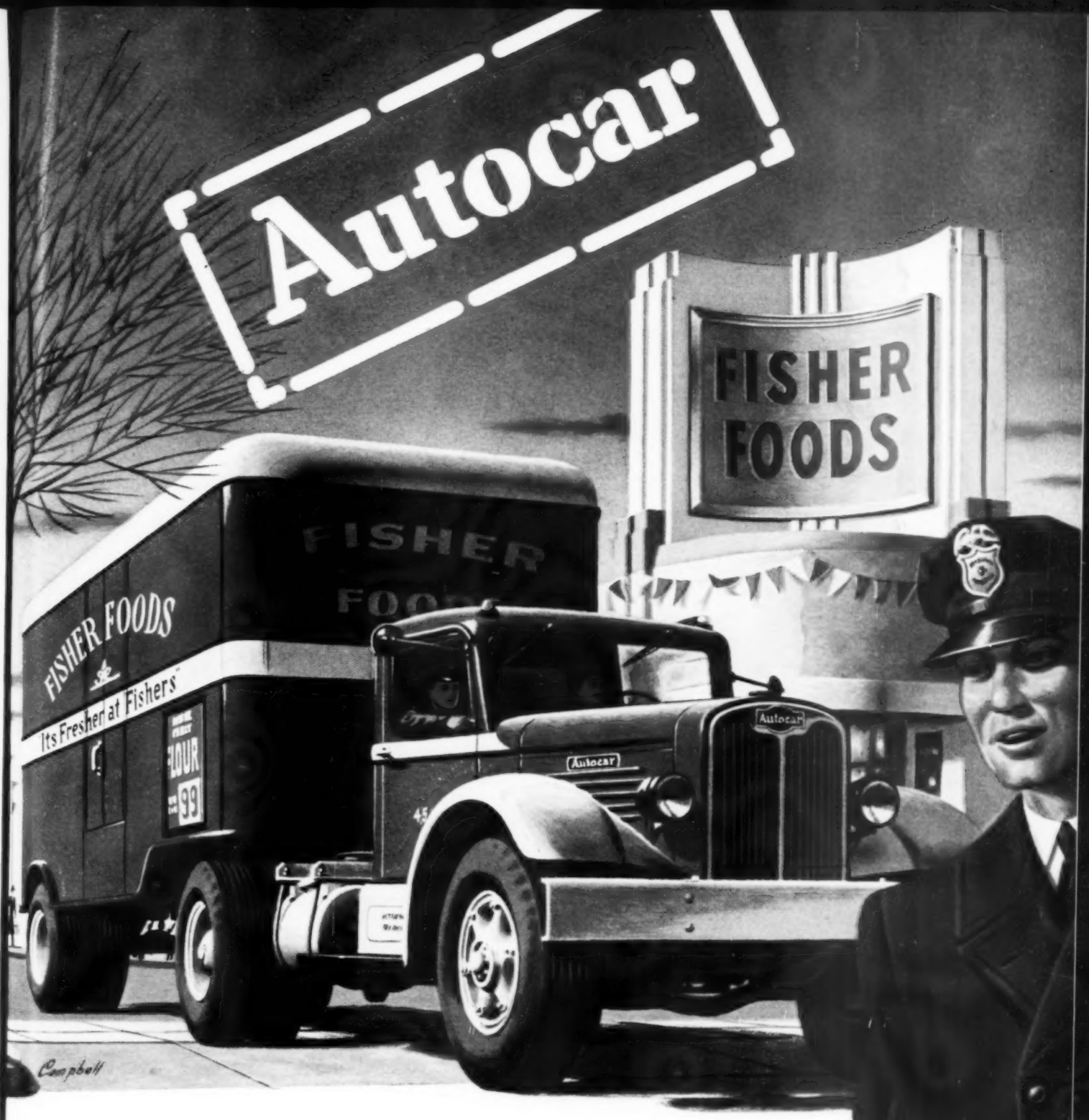

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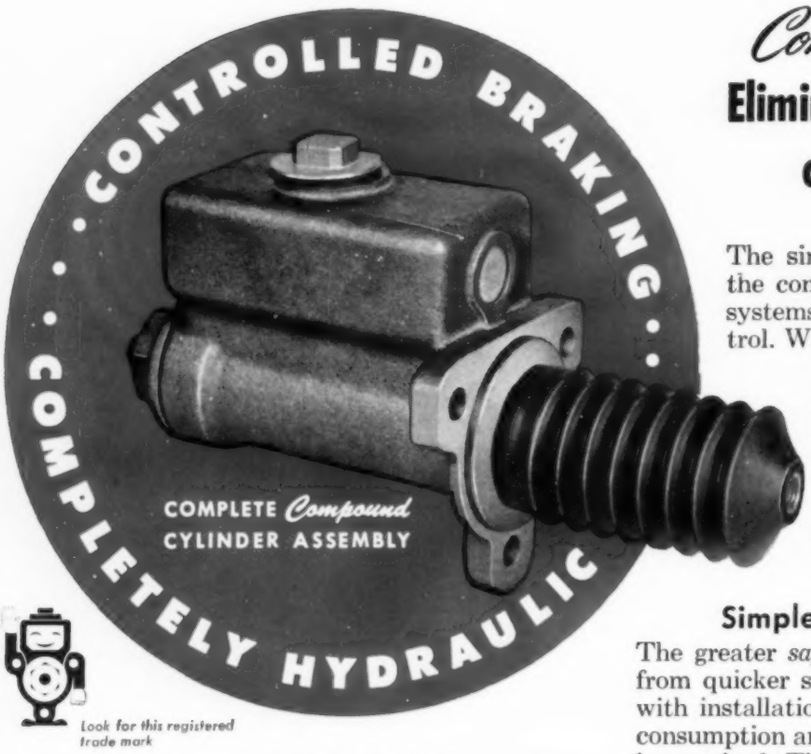

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The single HYCON unit does hydraulically the combined jobs of fluid-vacuum-air brake systems; gives greatly improved braking control. With HYCON, *all* pressures are *hydraulic* pressures. In direct proportion to pedal pressures, they always deliver the exact amount of power to meet load or no-load conditions, whether motor is running or not. The secret of this *controlled braking* is in a *second piston*—hydraulic, *not* atmospheric—contained in the single HYCON *compound* cylinder.

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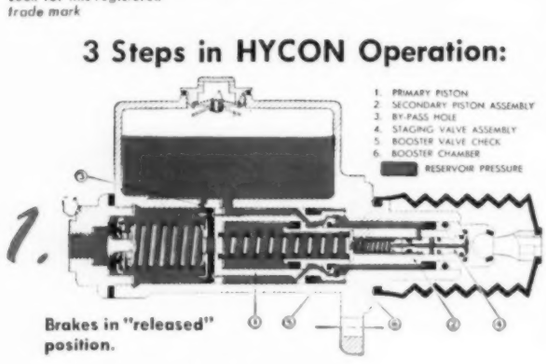
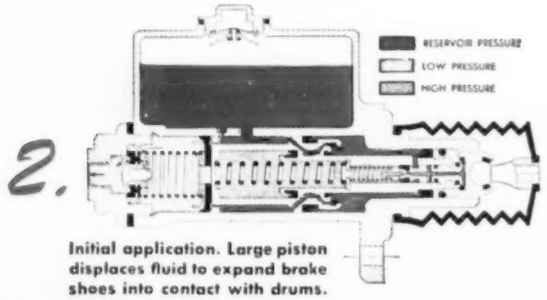
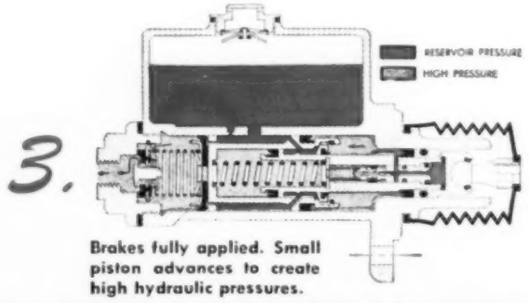


Brakes in "released" position.



Initial application. Large piston displaces fluid to expand brake shoes into contact with drums.



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responsible for originating such deposits. It is evident at present that two practical means of alleviating the difficulty present themselves, and to obtain best results, both should be employed.

1. Use lubricating oils which are capable of keeping contaminants in finely-divided suspension rather than permitting them to be deposited on engine parts.

2. Alter operating techniques thereby minimizing the formation of these contaminants.

An extensive program of laboratory engine tests covering fuels, lubricating oils and operating variables, was conducted to substantiate the concepts presented above.

LABORATORY ENGINE TESTS—*Operating Conditions:* The operating conditions employed in this accelerated laboratory test were developed to simulate in only 40 hours (2,000 miles) of engine operation the results from a fleet of 35 passenger-cars and trucks operated for a long period in service known to be predominantly low temperature. Table V compares the results of engine deposit and used oil analyses from this fleet and from the laboratory engine tests. It is evident that the results are similar, although the laboratory test is more severe.

TABLE V
COMPARISON OF SERVICE AND LABORATORY TESTS

Deposit Components (Oil-free Basis)	*Average for Vehicles*	*Average from Laboratory Engine Tests*
Diluent, %	25.4	20.3
Water, %	32.4	31.5
Oxidation Products, %	5.4	8.2
Free Carbon and Carbonaceous, %	9.2	3.7
Free Mineral Matter, %	27.6	16.3
Total %	100.0	100.0

Used Oil Analyses	*Average for Vehicles (2000-Mile Basis)*	*Average from 2000-Mile Laboratory Engine Tests*
Neutralization Number	2.7	4.2
Dilution, %	10.7	17.1
Oil Insolubles, %	2.06	1.99
Oil Soluble Oxidation Products, %	0.15	0.21

TABLE VI
LABORATORY ENGINE TEST CONDITIONS

Engine	1942 Chevrolet
Fuel	Regular grade. Maximum TEL
Oil	SAE 20, 95 VI, Straight Mineral
Speed, rpm	2500
Load, BHP	45
Jacket Temperature, °F.	95
Crankcase Oil Temperature, °F.	155
Intake Manifold Temperature, °F.	95
Ambient Temperature, °F.	Room (aver. 90° F.)
Crankcase Ventilation, cu. ft. air/min.	1.0
Air-Fuel Ratio	14.5
Test Duration, hours	40 (2000 miles)
Oil Changes	None
Oil Filter	None

The basic test conditions are outlined in Table VI; regular grade motor fuel containing the maximum permissible amount of tetraethyl lead was used. Constant engine performance is insured throughout each series of tests by employing reference runs, under the conditions outlined, before and after each test run; results of test runs are compared with these reference runs.

Evaluation of Test Results: Comparisons are accomplished by weighing piston skirt, oil ring and pan and cover plate deposits and rating those from the test run on the basis of an assigned value of 100 for the average of the two reference runs. For example, assume that piston skirt deposits from a test run amount to 0.7 grams and the average from preceding and succeeding reference runs is 1.4 grams, then the piston deposit rating for the test run is

$$\frac{0.7}{1.4} \times 100 = 50.$$

In addition to such comparisons, photographs of various engine parts are taken for each run. Figures 3, 5 and 6 show the dirty condition of engine parts following a typical reference run, while Figure 4, 7 and 8 show similar parts following a test run demonstrating the vastly improved performance which can be obtained by simple operational changes.

TEST RESULTS: Results of investigations to alleviate low temperature sludge through modifications in fuel, lubricating oil and operating conditions are summarized in Table VII. These modifications will be discussed separately below and considered with respect to their service application.

Fuel: Inasmuch as low temperature deposits are associated with incomplete combustion of oxidation products originating from the fuel, which are thought to form resinous material insoluble in the oil, it follows that the fuel employed should have some bearing on the formation of such deposits. The part played by fuels in this connection is currently under investigation. With the incomplete information available and the problem still far from solution, it is not possible to draw conclusions or make practical recommendations at the present time.

Lubricating Oils: Heavy-duty oils will reduce engine deposits in some respects, however, they do not comprise a complete solution.

Since lubricating oils of the heavy-duty type possess the ability to retain insoluble matter in suspension, they would be expected to show a reduction in low tempera-

(*Please turn to page* 82)

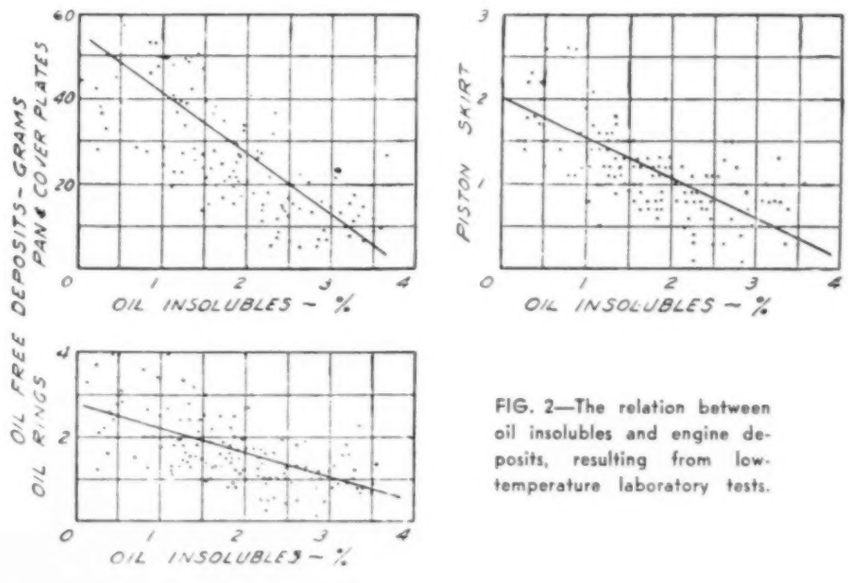

FIG. 2—The relation between oil insolubles and engine deposits, resulting from low-temperature laboratory tests.

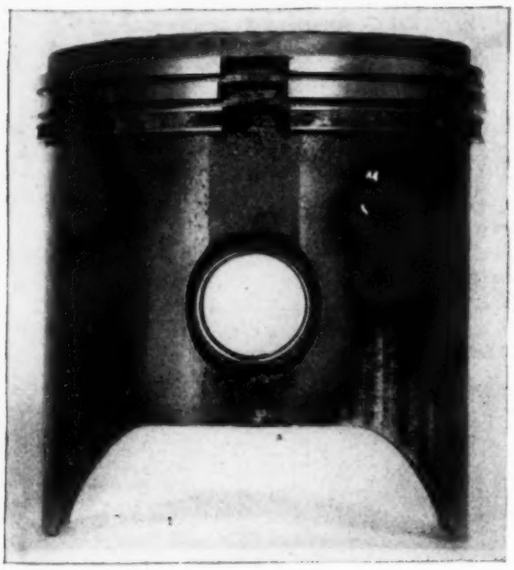

FIG. 3—Piston from typical laboratory engine low temperature reference run.

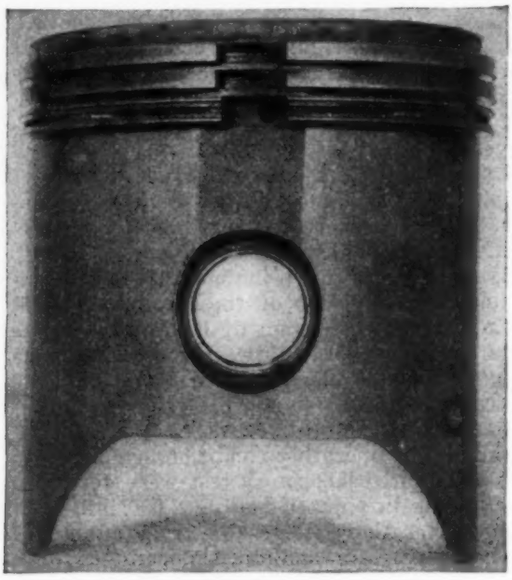

FIG. 4—Piston from laboratory engine test run using improved operating conditions.

ture sludge formation. The data in Table VII indicate that use of these oils, although not a complete solution to the problem, results in improved performance, particularly in regard to reduction of oil ring, oil pan and cover plate deposits.

Jacket Temperature: Operating jacket temperatures in the 160°-180°F. range should be maintained at all times. Where engines are idled overnight, jacket temperatures should also be maintained in this range if possible. Better still, operations would be improved by not idling at all.

Tests made under the regular conditions outlined in Table VI at jacket temperatures from 95 to 180°F. demonstrate that increasing jacket temperature to 120° F. results in considerable improvement; further increase to 180°F. results in a still greater reduction in engine deposits.

Further runs were conducted in a cold room at 0°F. with the engine idled for 40 hours, thereby simulating the winter practice employed by some operators to idle their engines overnight when stored outdoors. Jacket temperature was varied from 80 to 160°F. with results paralleling those mentioned above. Throughout these runs a crankcase oil temperature of approximately 90° F. was observed. In this case, an increase in jacket temperature to 120° F. or above largely eliminated the deposits obtained at 80°F. It will be noted that this operation produced only pan and cover plate deposits; pistons and oil rings were substantially clean, apparently due to their low temperature and the washing action of the excessive diluent present. However, even under the most favorable conditions investigated, considerable dilution and oil contamination occurred and upon subsequent road operation these materials would undoubtedly lead to further deposit formation.

Crankcase Oil Temperature: Crankcase oil temperature should be maintained at approximately 180° F. in order to minimize deposits. Temperatures above or below this value appear to aggravate engine deposits.

An increase in crankcase oil temperature from 155° to 180°F. results in a significant improvement in operation, particularly in regard to reduction of oil ring and pan and cover plate deposits. With further raising of oil temperature to 225°F., a general increase in deposits is observed over those obtained at 155° and 180°F. This is due to the fact that at this oil temperature the deposits are composed of both high and low temperature materials, thereby producing a combined effect resulting in a dirtier engine. At 265°F. an analogous situation exists except that in this case low temperature materials are minimized with resultant reduction in deposits from those obtained at 225°F.

Intake Manifold Temperature: Intake manifold temperature should be maintained at the highest value possible consistent with freedom from manifold deposits.

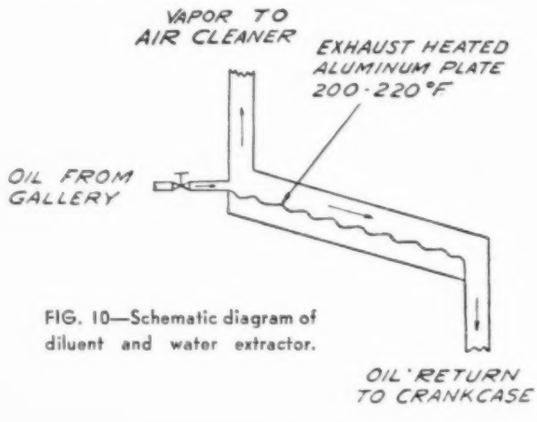

FIG. 10—Schematic diagram of diluent and water extractor.

Since engine deposits are associated with poor combustion of the fuel, any measures taken to improve combustion (such as increasing intake mixture temperature) would be expected to improve performance. Intake mixture temperatures from 70° to 190° F. were investigated. It will be observed in Table VII that increasing intake manifold temperature results in a consistent and substantial reduction in the engine de-

(*Please turn to page* 84)

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posits measured. It is of interest to note that at manifold temperatures of 160° F. and higher, carbon-like deposits were observed in the intake manifold.

Air-Fuel Ratio: Carburetors and air filters should be maintained in good condition by conforming to best service practices.

Since air-fuel ratio is known to alter combustion, it should be expected that changes in air-fuel ratio would influence low temperature engine deposits. Tests were conducted at air-fuel ratios ranging from a lean value of 18.2:1 to a rich value of 10.5:1. In the case of lean mixtures, deposits are generally increased over those obtained at normal mixtures, possibly due to intermediate combustion products with this slower burning mixture and the presence of excess air. With rich mixtures engine deposits are greatly reduced. Since extensive fuel dilution occurs with such mixtures the reduction of deposits is apparently associated with the washing action of the diluent as well as with possible changes in combustion occasioned by a deficiency of air.

In actual service rich mixtures are not very practical because of fuel economy, while lean mixtures lead to detonation and pre-ignition with their attendant serious difficulties. It thus appears that alleviation of the low temperature sludge problem through carburetion is not feasible. However, carburetion equipment should be maintained in good condition.

Lubricating Oil Viscosity: The most viscous lubricating oil consistent with starting requirements and other factors should be used.

Although a wide choice in oil viscosity is not always possible due to starting limitations and other factors, it was considered desirable to ascertain the effect of viscosity on engine deposits. Tests were conducted on lubricating oils ranging from SAE 10 to 50. The data in Table VII indicate that a consistent improvement is realized with increased viscosity. It is possible that the more viscous oils may contribute to improved performance through improved piston-cylinder seal. However, improvement is primarily a result of the ability of the heavier oils to hold more contaminants in suspension, to be drained with the used oil, rather than deposited throughout the engine. This

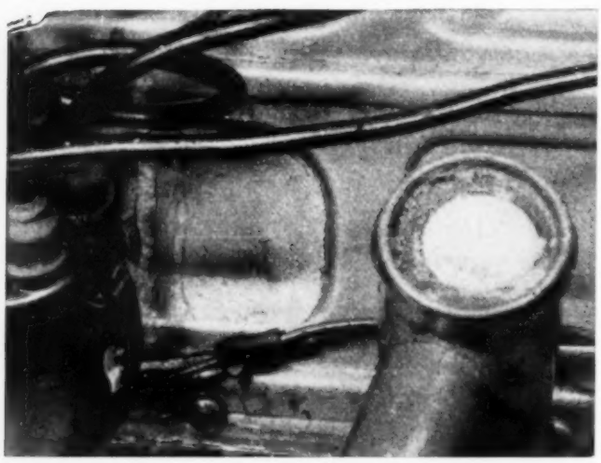

FIG. 9—Frozen condition of breather screen, resulting from engine idling in cold room at 0° F. . . . There is also ice in pipe.

TABLE VII

RESULTS OF LABORATORY ENGINE LOW TEMPERATURE SLUDGE TESTS

Phase of Investigation	*Relative Deposit Weight, %*		
	Piston Skirts	*Oil Rings*	*Oil Pan and Cover Plates*
Lubricating Oil			
Straight Mineral (reference)	100	100	100
Heavy Duty (A)	81	37	56
Heavy Duty (B)	88	43	19
Jacket Temperature (regular test, 90° F aver. ambient)			
95° F. (reference)	100	100	100
120	68	33	66
180	51	35	28
Jacket Temperature (500 rpm idle, 0° F. ambient)			
80° F. (reference)	Trace	Trace	100
120	Trace	Trace	9
160	Trace	Trace	19
Crankcase Oil Temperature			
155° F. (reference)	100	100	100
180	82	53	67
225	180	58	192
265	88	94	45
Intake Manifold Temperature			
70° F.	101	133	250
95 (reference)	100	100	100
160	55	50	77
190	44	41	58
Air-Fuel Ratio			
18.2:1	130	68	150
14.5 (reference)	100	100	100
10.5	74	6	13
Lubricating Oil Viscosity			
SAE 10	100	83	112
" 20 (reference)	100	100	100
" 30	76	41	56
" 50	52	31	37
Oil Change Period			
40 hours (reference)	100	100	100
10 "	58	72	53
5 "	34	---	22
2.5 "	15	---	13
Oil Filter (cotton waste, full flow, large capacity)			
None (reference)	100	100	100
Case without element	62	79	39
Complete with element (no changes)	54	68	16
Oil Filter (cotton waste, by-pass)			
None (reference)	100	100	100
No element changes	87	99	104
Element change at 20 hours	136	84	41
Crankcase Ventilation			
1 cfm (reference)	100	100	100
3 "	121	77	55
1 " reversed flow	139	110	109
3 " reversed flow	111	137	88
Diluent and Water Extractor			
None (reference)	100	100	100
Extractor with 5 qts./hr. oil flow	116	137	250
Extractor with 25 qts./hr. oil flow	92	137	50
Improved Operating Conditions			
None (reference)	100	100	100
With conditions changed from those in Table VI in following respects	18	11	10
Oil—Heavy Duty (SAE 20)			
Jacket Temperature—160° F.			
Crankcase Oil Temp.—180° F.			
Intake Manifold Temp.—150° F.			
Oil Changes—20 Hours			
Oil Filter—Yes			
Oil Filter Element Changes—20 hours			

characteristic is indicated by the following data obtained on the used oil from these tests:

SAE Grade	*Oil Insolubles, %*
10	0.87
20	1.27
30	1.50
50	2.66

Oil-Change Period: All efforts should be made to change oil as frequently as possible, consistent with allowable costs and maintenance schedules.

Previous discussion pointed out that under low temperature conditions negligible oil oxidation occurs and contaminants are present largely as oil insolubles. If these materials were frequently removed, improved performance should result. Accordingly, tests were conducted varying oil drains from the normal 40 hours (2000 miles) to as low as 2½ hours (125 miles). It is evident from data in Table VII that there is a marked reduction in engine deposits with more frequent oil-changes.

Oil Filter: Reduction of engine deposits can be obtained by the use of an efficient full-flow filter. However, the standard by-pass type is effective, provided frequent element changes are employed.

(*Please turn to page* 180)

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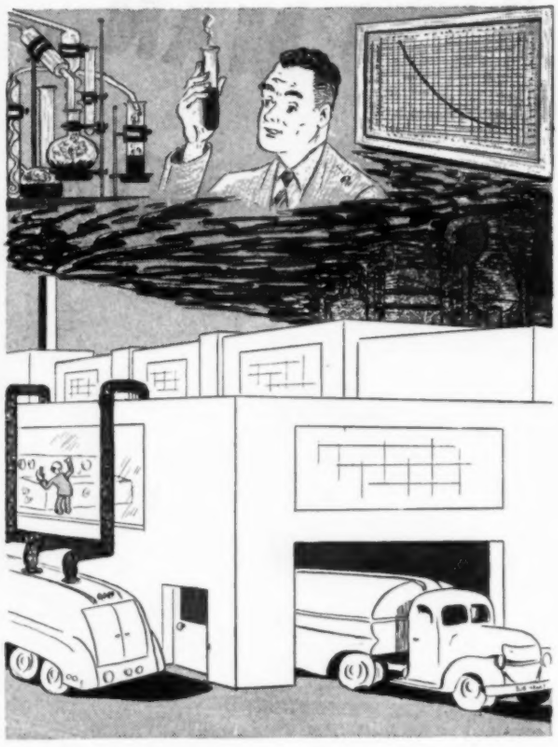
What S.A.E. Men Were Told about the New Synthetic Lubes



NEW SYNTHETIC OIL IS REVEALED AT S.A.E. ANNUAL MEET

•

THIS REPORT ABSTRACTS the HIGHLIGHTS of an EXTENSIVE SAE PAPER, READ LAST MONTH — IT TELLS, for the FIRST TIME, the "STORY" on the NEW SYNTHETIC LUBES

TWO new synthetic lubricants, containing no petroleum oils, have been developed by units of Union Carbide & Carbon Corporation; they are *not* related to the synthetic lubricants developed in Germany. The new lubricants constituted the subject matter of an extensive paper presented at last month's SAE Annual Meeting, by J. C. Kratzer of Linde Air Products Company, and D. H. Green and D. B. Williams, both of Carbide & Carbon Chemicals Corporation.

Described as the LB and 50-HB series, respectively, the LB series is *insoluble* in water and is adapted to the lubrication of machinery, including internal combustion engines, while the 50-HB series is *soluble* in water, and is said to be satisfactory for the general lubrication of metal, rubber and other materials.

Laboratory and road tests of the automotive type LB synthetic lubricants, according to the spokesmen, indicate clean engine operation because of solvent action, easy starting at low temperatures, and smaller than normal engine deposits. Tests with military engines were reported to disclose that the new LB lubricants show great freedom from sludge and varnish formation, good starting and operation in cold weather, and other excellent performance results. The price is reported as being from two to three times that of petroleum lubricants and it is being marketed only in limited quantities and areas.

It was pointed out that the LB lubricants can be made in any desired viscosity without blending and that the characteristically high viscosity-index which they exhibit, is inherent and is not dependent on viscosity-index improvers. A low pour-point, too, is said to be characteristic of the new LB series. Their non-sludging characteristics would seem to adapt the new lubricants to special uses, in addition to automotive engines, including hydraulic fluids, differentials, transmissions, etc., as greases showing unusually high and low temperature properties are said to have been made, experimentally, from these oils.

Rather than burden you with a lot of complicated technical specifications, comparing the new synthetic lubricants with those with which we have become commonly familiar through long years of usage, let us report a few of the more intimate, practical highlights of the paper which was presented on this subject. First, a lubricant of the LB series (LB-300) is already being marketed. In two limited areas in the East this winter it is being sold for use in automobiles, trucks, buses and tractors under the name of "Prestone Motor Oil", as it is being marketed by the National Carbon Company. Since this type of lubricant is inherently more expensive to produce than petroleum lubricants, its selling price is greater; i.e., reportedly 75¢ per quart.

In considering a product which is chemically, and in other respects, quite different from petroleum oils, a number of questions will naturally arise, such as: Is it a good lubricant? Is it resistant to oxidation? How does wear of the engine compare with the best petroleum oils? Does an engine consume more of this new synthetic oil? Does it corrode the bearings and other parts of the engine? Does it permit engine starting under low temperature conditions? Does it form more or less sludge and varnish in an engine than petroleum oils? The engineers and laboratories of Union Carbide, company spokesmen declared, can provide the answers to these and other questions.

The authors of the paper presented at the SAE Annual Meeting presumed to elaborate on the foregoing questions, substantiating their optimistic claims for the new synthetic oils by considerable laboratory and field testing data. In addition to a fleet of test cars owned by Union Carbide's laboratory at Tonawanda, N. Y., forty vehicles operated by laboratory employees have been continuously used for test purposes, they said. Also, over one hundred automobiles operated by private individuals have been on a test basis for over a year. Road experience has been further supplemented, it was pointed out, by tests in three privately-owned truck fleets *not* connected with Union Carbide or its subsidiaries, as well as by U.S. Army tests in Ordnance vehicles and Air Force engines.

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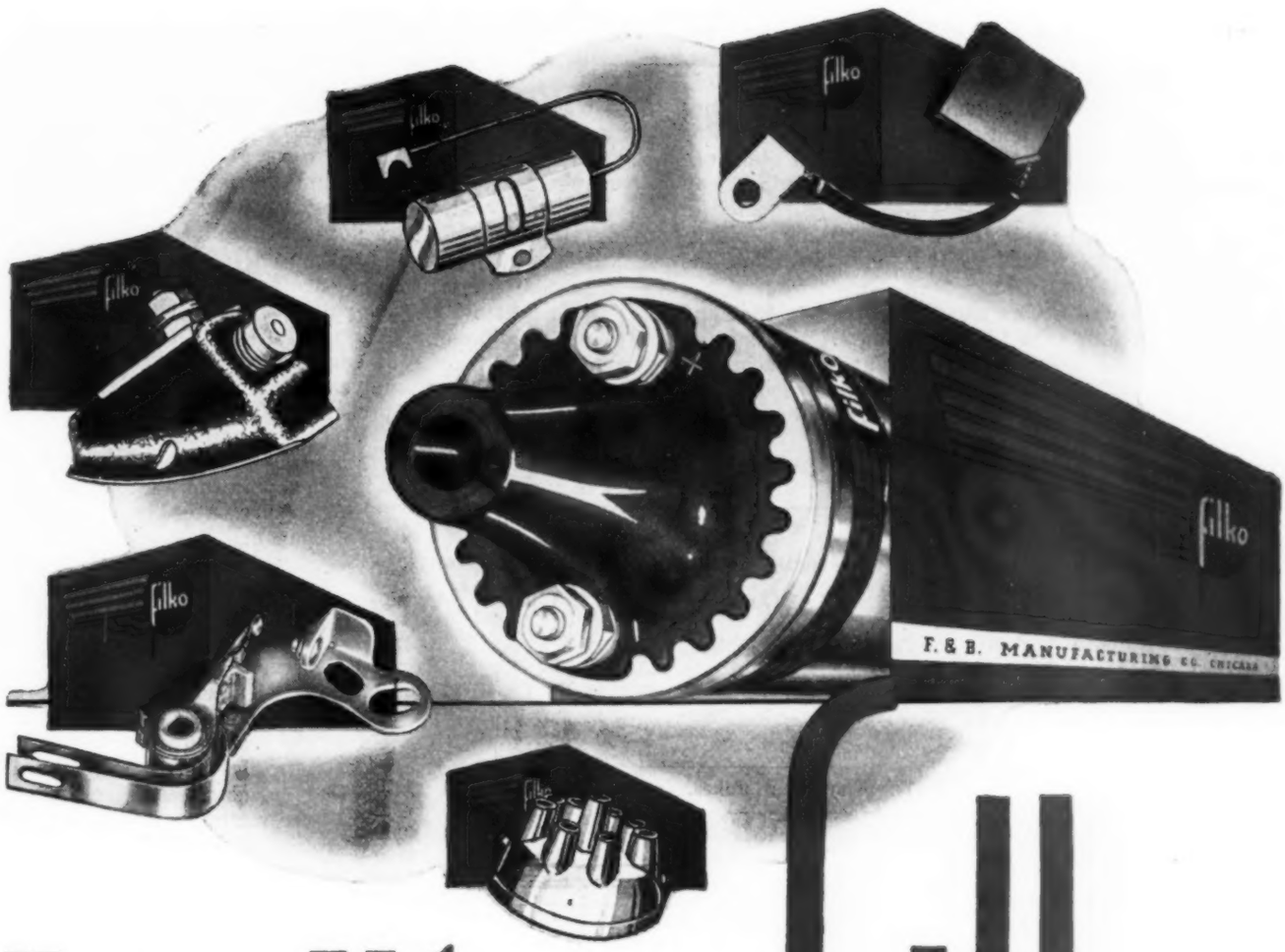

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The engineers feel that performance tests in engines on the dynamometer and in vehicles, have greater significance than laboratory tests, and have therefore included in their paper quite a number of reports on the performance of the new synthetic lubricants in vehicle field tests, substantiated by much data, tables, etc. For example, we quote the following from the SAE paper on this subject:

"A number of new cars were purchased in 1942 and serviced with lubricant LB-300. Some of the engines were dismantled and the parts accurately measured prior to servicing with this synthetic lubricant, but most of the engines were started on test after a simple drain and flush procedure. Conclusions drawn from these tests may be summarized as follows:

"(a) Clean engines remained essentially sludge and varnish-free under operating conditions which normally promote formation of these oxidation products.

"(b) Wear of engine parts and bearings was equal to that of petroleum oils.

"(c) Oil consumption compared favorably with petroleum oils.

"(d) LB-300 permitted starting of the engines under low temperature conditions.

"(e) The oil does not adversely affect gaskets and fiber timing gears.

"(f) Leakage is not a problem in a properly gasketed joint. However the lubricant is a solvent for the oxidation products of petroleum oil and the cleaning action of the synthetic lubricant may tend to open up leaks plugged with oil oxidation products.

"(g) In cars operated exclusively on the synthetic lubricant, there was less than the normal amount of combustion chamber deposit."

PROPERTIES of NEW SYNTHETIC LUBRICANT

(Automotive Type LB-300)

Viscosity, Saybolt Sec. @	210° F.	62.7
	100° F.	300
	0° F.	18380
	—30° F.	183000
	—50° F.	1370000
Viscosity, Centistokes, @	210° F.	11.0
	100° F.	65.0
	0° F.	4000
	—30° F.	40000
	—50° F.	300000
V.I. (ASTM D-587-41)		142
Pour Point (ASTM D-97-39)		—40
Density @ 210° F. (g./cc.)		.933
Density @ 100° F. (g./cc.)		.979
Specific Gravity @ 60° F		.997
Gravity °API @ 60° F		10.5
Flash Point (ASTM D-92-33), °F		470
Fire Point (ASTM D-92-33), °F		570
Carbon Residue (ASTM D-189-41)		—.01%
Ash (ASTM D-482-43-T)		—.01%

Along with the presentation of this paper came a series of eight photographs of various engine parts of test vehicles said to have been operated exclusively on this synthetic lubricant for 50,000 to 70,000 miles. The clean condition of these engine parts was quite well shown in these photographs.

Other tests were also reported, made among several commercial fleets. An effort was made to select fleets that represented conditions of: (a) low mileage, high gasoline dilution, water condensation and heavy sludge; (b) medium mileage, intermittent and idling type of operation; and (c) heavy-duty, medium to high mileage operation under high and low ambient temperature conditions. In each of these fleets several of the engines were initially inspected and at various intervals thereafter, to observe the sludge conditions.

No special precautions were taken in changing these fleets over to synthetic oil, except to change the filter cartridge if the vehicles were so equipped, and to change the test lubricant and filter cartridge after 500 miles of operation. Each of the fleets was run with a different oil-change period and one fleet was operated without an oil-change for the total mileage.

In all of these cases the fleets were under the control of the fleet operator during the entire test, according to the engineers. Analysis of the used lubricant samples, inspection of engines, tabulation of lubricant consumption and analysis of the operating record, constituted the test program. We quote below some of the significant conclusions drawn from these tests (now in their second year), as presented in the SAE paper:

"(a) Out of over a hundred vehicles serviced, none had any loss in oil pressure, indicating a clogged screen.

"(b) Vehicles which were inspected at the start of the test and inspected periodically thereafter, showed a gradual cleaning-up of the engine, with no formation of new sludge. After a year's operation, disassembled engines were essentially free of sludge and varnish.

"(c) In vehicles in which petroleum oil had been changed regularly because of lubricant deterioration as a result of severe service conditions, analysis of the synthetic lubricant indicated the change period could be at least doubled. However, in those vehicles where mineral oil was changed because of gasoline dilution or some other factor of contamination, the lubricant change period could not be extended. To study resistance to deterioration, a few test vehicles equipped with filters have so far been driven 30,000 miles without changing the oil. In these cases, the engines remained clean and there has been no indication of abnormal lubricant deterioration. The oil filter cartridges are being changed at recommended intervals. These tests are being continued.

"(d) Improved low temperature cranking and starting characteristics were experienced in vehicles operating in low temperature areas.

"(e) In engines where the consumption of mineral oil was high primarily as a result of leakage past the pistons into the combustion chamber, spark plug fouling was reduced or eliminated when the synthetic oil was substituted.

"(f) The average lubricant consumption compared favorably with the consumption of petroleum oils used

(*Please turn to page* 152)

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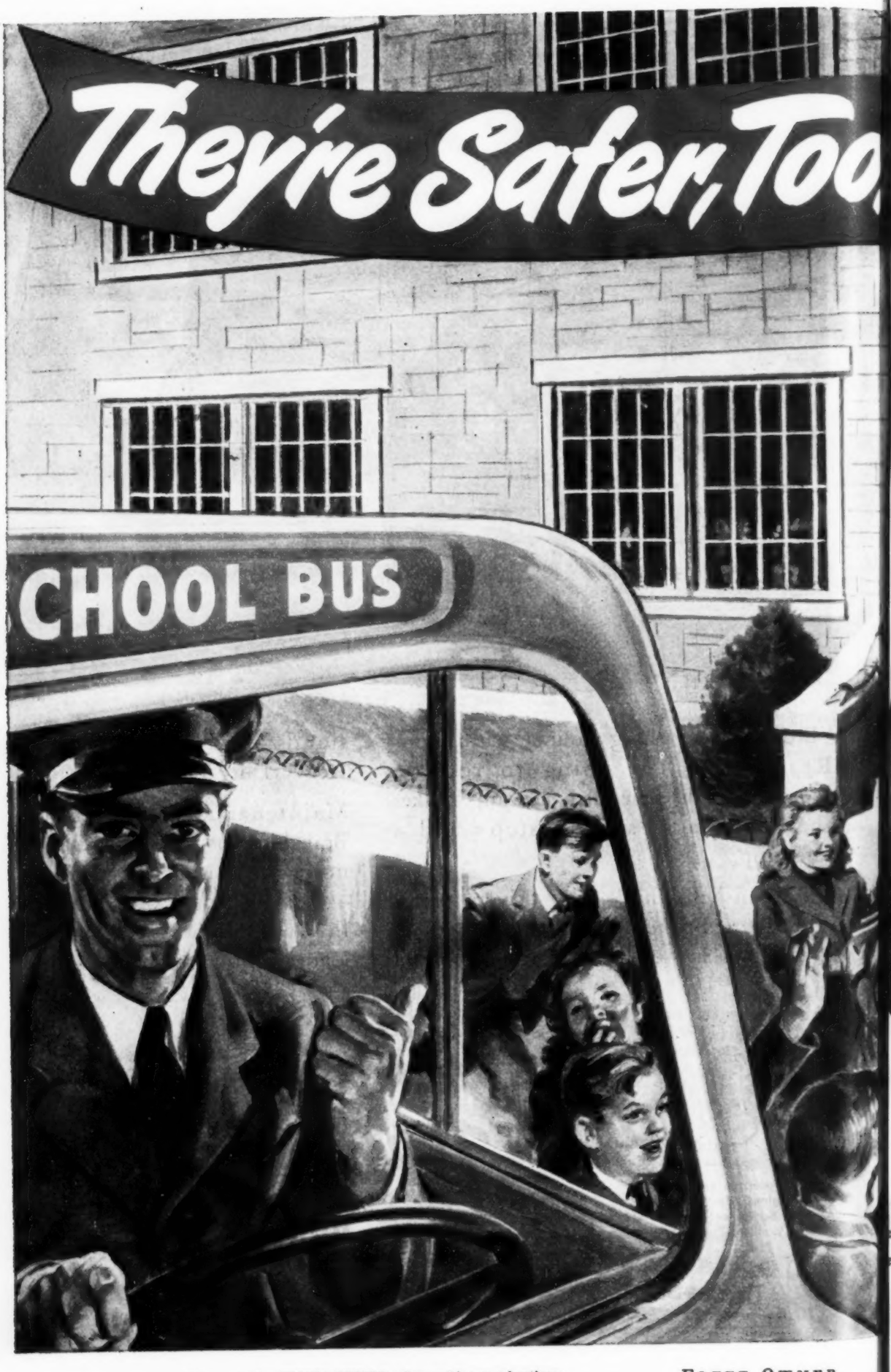
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*Source of data: *Hearings before a Special Committee Investigating the National Defense Program, United States Senate — Seventy-eighth Congress, First and Second Sessions.*

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HOW SHOULD TRUCK BRAKES BE RATED?

THIS REVIEW of BRAKE DESIGNS AND METHODS of RATING BRAKES for COMMERCIAL VEHICLES was PRESENTED at THE RECENT S.A.E. ANNUAL MEETING

By Ralph K. Super,

Engineer, Brake Division,
The Timken-Detroit Axle Company

HOW big should the brakes be on a truck and how big should they be on a bus? How much lining area should the brakes have? Does this lining area insure heat-dissipating capacity in the brake and satisfactory mileage life?

These questions are typical of those presented regularly to the brake engineer by the operator and vehicle manufacturer. There have been several methods of analysis for determining brake sizes which have been quite widely used. Figures based on these methods are frequently incorporated in vehicle specifications.

The purpose of this paper is to review the current methods of analysis and indicate particularly where they are capable of improper interpretation and misuse. Corrective suggestions based on such information as is available will also be included. It is believed that a summation of this information will stimulate thinking along the line for formulating a standard and universal method for determining the size and capacity of automotive brake equipment.

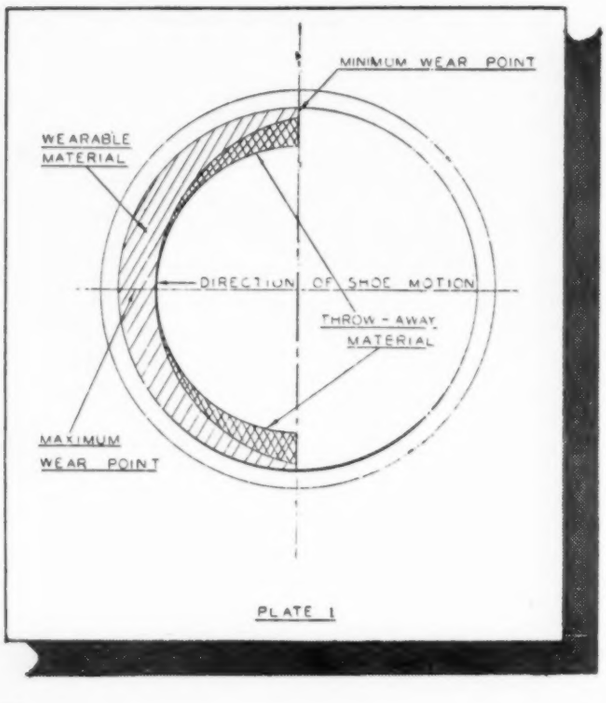

PLATE 1

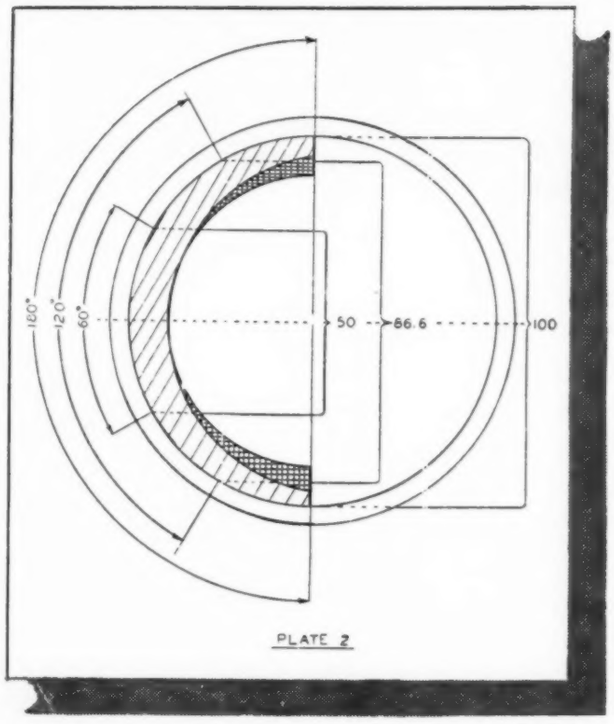

PLATE 2

Reference to the chassis specifications in any of the automotive magazines will reveal that the wheel brake sizes are listed in the tabulation and also, the corresponding lining areas. The availability of the lining area information has made it a simple matter to use this figure as a basis for determining the adequacy of the vehicle brakes.

Over a period of fifteen years it has been determined from field experience that a truck having a gross vehicle load rating and lining area ratio so that a figure of 40 pounds g.v.w. per square inch of lining prevailed, would give satisfactory brake performance under average conditions of operation. Experience alone indicated whether the figure 40 should be increased or decreased to meet variations of these conditions. For instance, brakes used in transit bus service are given a rating of 25 pounds g.v.w per square inch of brake lining, based on the seated load, due to the greater frequency of stopping.

There is no question about the convenience of dividing the vehicle weight by 40 or 25 and checking the resulting figure obtained against the total brake lining area. The accuracy of this method is questionable, however. As an example, it is a known fact that the overall width of the vehicle is restricted and that the space available for brakes is limited. This is particularly true where dual tires are mounted, such as the rear axle. It is not uncommon for the area-weight ratio for the brakes on the rear axle to be higher than desired or specified. As a consequence, the brakes on the front axle are oversized and a low factor is obtained for that location. When the figures for both front and rear axles are combined, a satisfactory overall factor is indicated. The fallacy of this reasoning is that it is impossible, due to steering difficulties, for the front brakes to handle

(*Please turn to page* 94)

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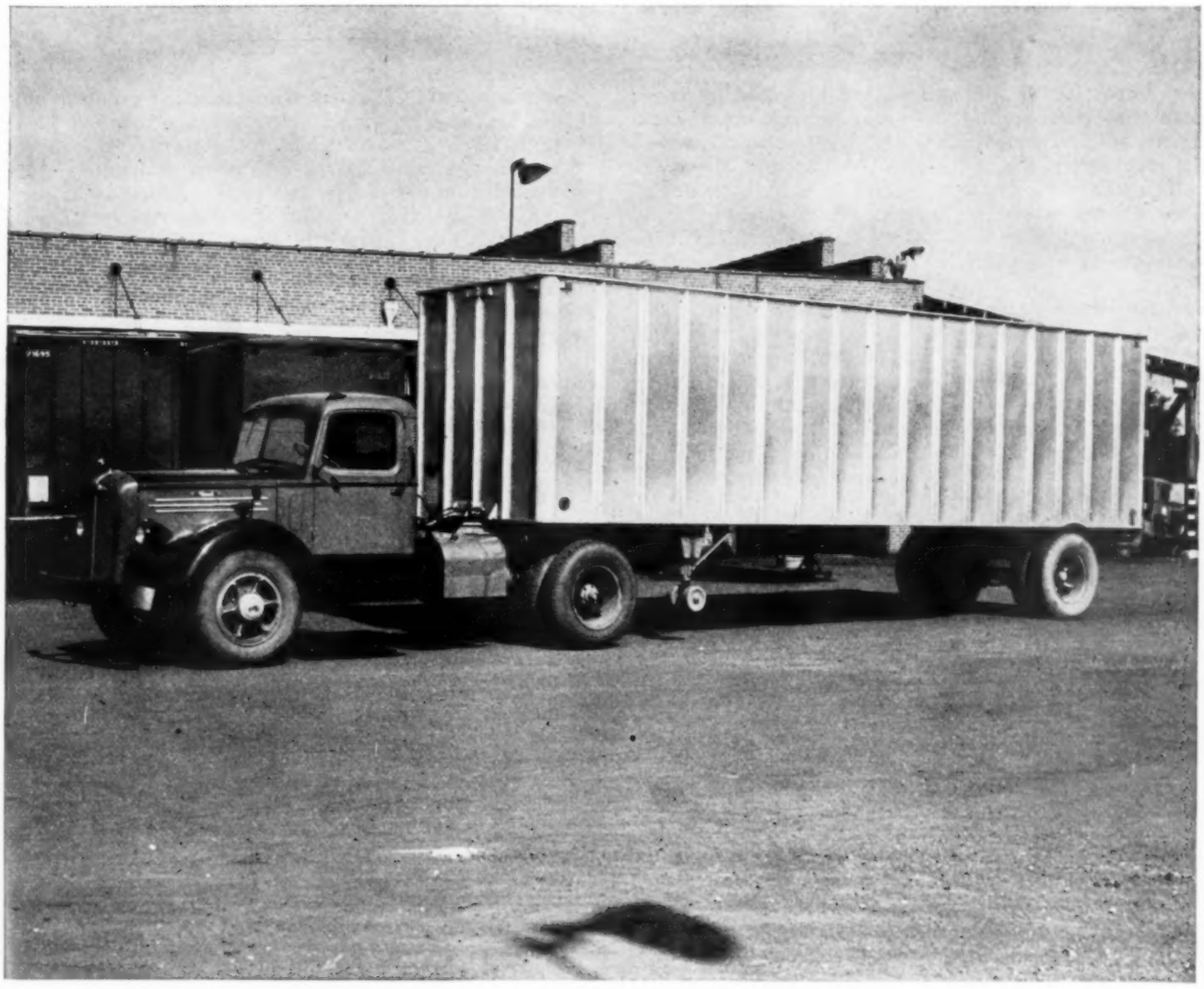

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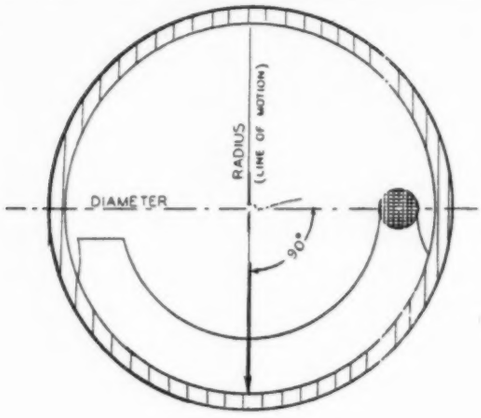

PLATE 3

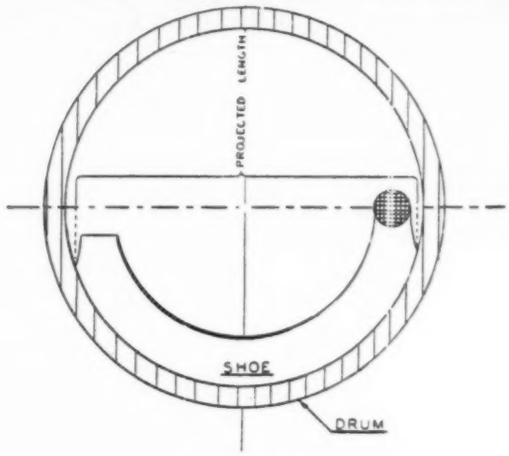

PLATE 4

the proportion of the vehicle load indicated by their area and consequently, the rear brakes must work under an overloaded condition, with subsequent unsatisfactory results.

The simple answer to this problem is that the lining area figures should be separated into those existing on each axle. The load figures thus obtained will be more nearly correct.

In utilizing the area of the brake lining as the basis for determining the adequacy of the vehicle brake equipment, it is only natural to assume that the greater the lining area, the more the load capacity of the brake. The tendency, therefore, is to add lining to the brake shoes until the entire braking surface of the drum is covered. On some brakes, particularly hydraulic brakes utilizing so called "long" and "short" liners, it is possible to increase the lining area approximately 30 per cent.

It is seldom questioned whether the addition of this area of friction material contributes any improvement in the performance of the brake, even though the load area factor is better. The fallacy of this reasoning is evident. Adding lining on a brake shoe to obtain greater area and capacity is not the answer. The real evidence of the error of this reasoning is the amount of lining still remaining on the brake shoe at the time re-lining becomes necessary. This lining cannot be used and must be thrown away.

It is not desired to enter into any complicated mathematical analysis of this conclusion, but a few simple sketches may indicate the reason for the actual results that are obtained. Assume that a brake shoe has an arc length of 180 degrees, as shown in Plate I, and that the lining extends over its full length. The shaded segment indicates that portion of the lining which will be worn from the shoe if the shoe is moved along a radius bisecting the shoe arc. The two checkered segments indicate the lining remaining on the shoe. Reference to Plate II will show the 180-degree arc divided into 30-degree segments. The shaded area is shown grouped into three arc lengths, viz., 60, 120 and 180 degrees. If a planimeter is run over each of these areas, it will be found that the shaded area within the 60-degree sector constitutes 50 per cent of the entire shaded area. Secondly, the shaded area within the 120-degree sector constitutes 86.6 per cent of the total. The remaining 13.4 per cent of the area is within the 180-degree sector.

These percentages are significant in that they indicate that one-half of the brake lining contributing to the life performance of a brake is in a zone of 60-degree length at the center of motion of the brake shoe. Also, 86.6 per cent is in the 120-degree zone shown. The center zone, therefore, is one-third of the total length and provides 50 per cent of the lining material. The 120-degree sector is two-thirds of the total arc length and provides 86.6 per cent of the material. The two end segments constitute one-third of the total arc length and provide the remaining 13.4 per cent. The material in the end segments is only 26 per cent as valuable as the material in the center sector. The cost of the material is the same for either location. Note, too, that the major part of the lining remaining on the brake shoes (checkered area) is in the end segments and will be discarded.

It should not be difficult to determine the limitations of lining length on the shoes based on the above percentages. It becomes a question of economics, as well as engineering. These figures further indicate the value of correctly positioning the lining on a brake shoe to secure its most efficient use. It would be extremely valuable and desirable if the load-area relation could be established so that it would automatically minimize the value of lining which could not be used efficiently for the improvement of the brake. Reference to the percentages shown for the shaded areas on Plate II discloses that in the 60-degree sector which extends 30 degrees on each side of the radius

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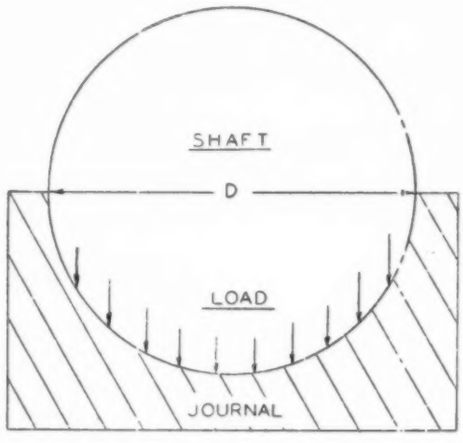

PLATE 5

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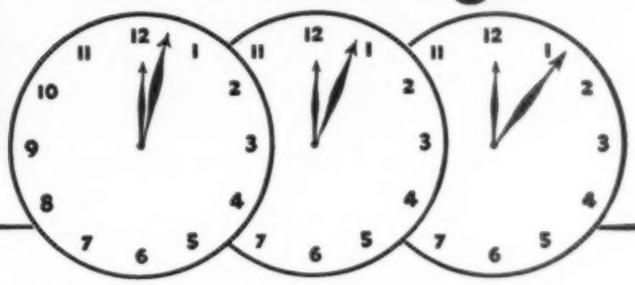

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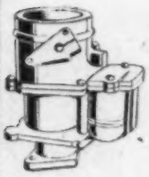

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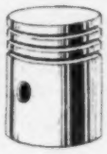

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through the center of movement of the shoe, a value of 50 percent is indicated. This percentage is exactly the same as the sine of half the sector angle. Half the sector angle is 30 degrees with a sine function of .5. These sine functions when scaled along a diameter at right angles to the direction of the shoe movement constitute the chord of the arcs projected onto the diameter.

The center sector of 60 degrees projects a length equal to .5 of the diameter, while the 120-degree sector projects a length of .866 of the diameter. The remaining end segments cover .134 of the diameter.

The translation of this concept of using the projected length of the brake lining as a basis for determining lining area, would mean that a brake would have to be analysed by drawing a diameter through the shoe anchor-pin and a radius established at right angles to this diameter. This radius would indicate the line of motion of the shoe. (Plate III). The lining arc would then be referenced onto the diameter by lines parallel to the radius. (Plate IV).

The factor of 40 pounds g.v.w. per square inch of lining as used for trucks was based on a lining length on the shoe equivalent to the arcuate length of the segment. This factor must be increased if the projected length of the lining is to be used, rather than the arcuate length as a basis for establishing the lining area. The relation of the arcuate length to a full diameter is 1.57. This figure would change the 40-pound factor to approximately 63 pounds. Although this appears to be correct, it is known that most conventional two-shoe brakes have a lining arc length of 110-130 degrees, so that a ratio between the arcuate length of a 120-degree arc and its projected length would be more nearly representative of a practical load-area figure based on current designs. The ratio of the length in this range is about 1.21 to 1. This figure then would increase the 40 pound factor to 48.4, or a round figure of 50 pounds g.v.w. per square inch of *projected* area of brake lining. The figure for bus brake rating would be 30-32 pounds weight per square inch of *projected* area of the lining.

The use of projected areas instead of arcuate areas as a means of rating brakes does not present difficulties to either the engineer or the operator, either in securing the information or interpreting the results. The direct relation between the lining material on the brake shoe, which may be removed by wear, and the *projected* area of this material, justifies the use of this method of rating brakes on an area-load basis.

A second method of rating brakes, also involving the use of lining areas, is one in which the unit *pressure* on the lining, as exerted by the actuating mechanism, is used as a basis for performance. A figure of 150-200 pounds pressure per square inch of lining is used for this rating and the area involved is that based on the arcuate length of the liner. This method is not widely used because of the necessity for having complete information on the mechanism for developing the forces on the brake shoes. The method is mentioned here because it will further indicate the diversity of methods of rating brakes. This method also encourages the addition of lining area with no consideration of its usefulness.

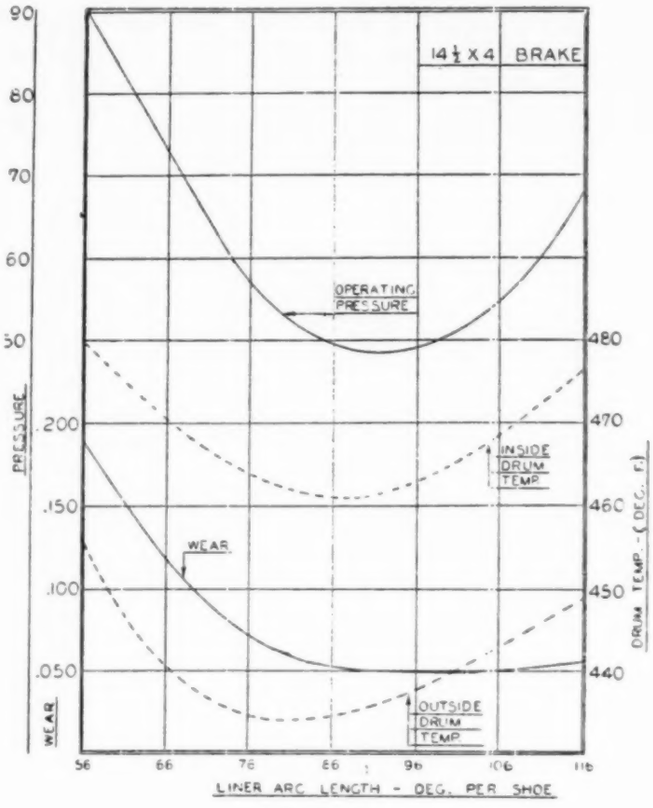

PLATE 6

A rigid brake shoe being forced against a brake drum, as shown in Plate III, is similar in many respects to a shaft bearing in a journal. (Plate V.) Reference to any handbook of mechanics reveals that the load on the journal is vertical and varies from a maximum at the center to zero at the sides. Also, the area supporting the load is that obtained by considering the diameter of the shaft and the length of the journal. This area in a journal is called the *projected* area. The application of this principle to a brake shoe would again mean that projected lining areas would be more accurate than arcuate lining areas, in establishing the unit pressure loadings based on the above method of rating brakes. The same correction factor as used in the vehicle load-lining area method would also apply here. This was 1.21 and the figure for unit pressure on the brake lining would be increased to 180-240 pounds per square inch of *projected* area of the lining.

It is hoped that this brief review of the load-area and pressure-area concept of rating brakes has indicated the necessity for analyzing the brake capacity of each axle as a separate unit and further that the *projected* area of the lining is a more accurate basis of rating than the arcuate area factor now in use.

The paper thus far has limited the analysis to conventional two-shoe brakes. There are also brakes

(*Please turn to page* 164)

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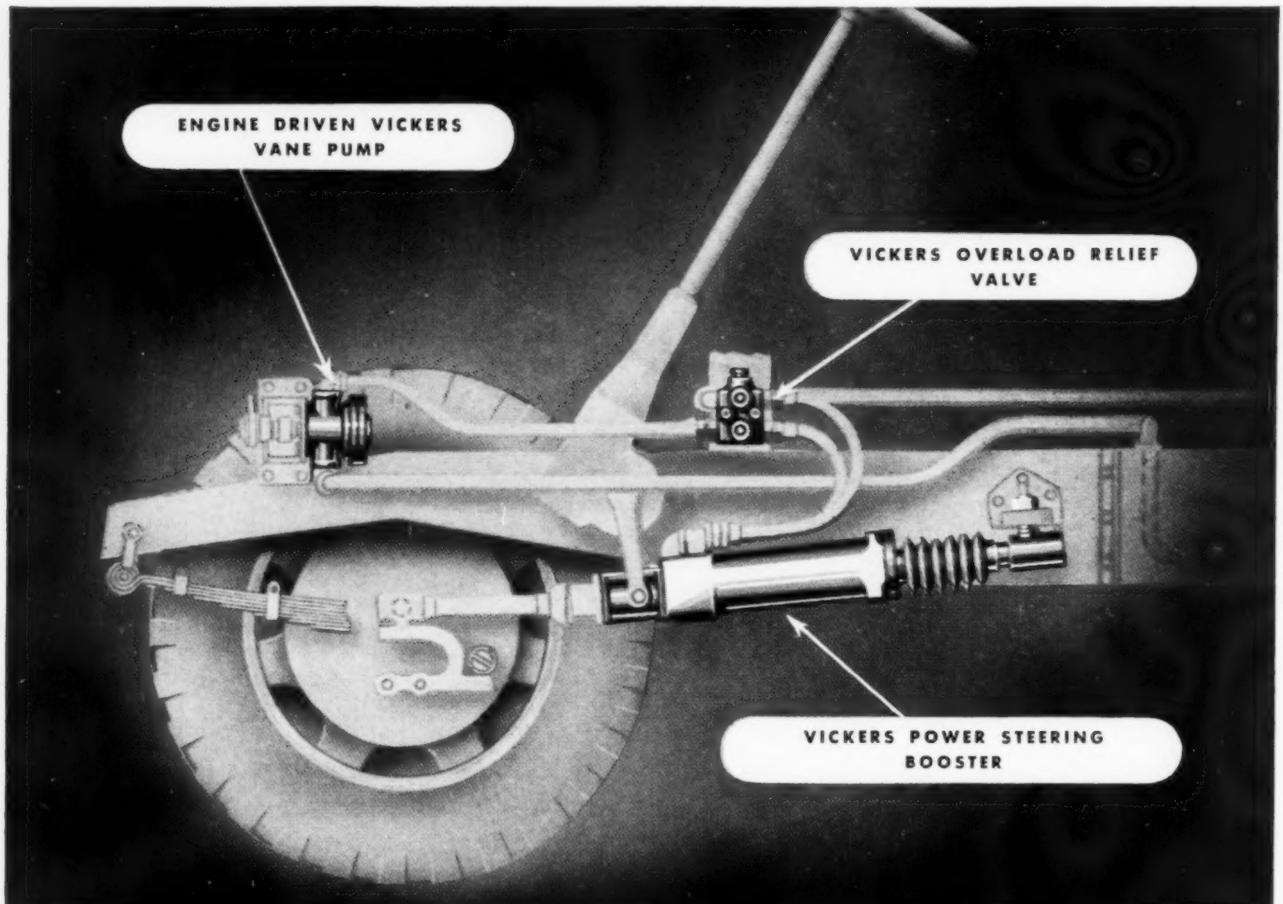

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By Morris Greenberg,
Maintenance Supt.,
Werner Transportation Company,
Minneapolis, Minn.

ONE of the fleet's tractor-trailers, all 225 of which are equipped with electric sanders. . . . Below: The author is here explaining operation of the sanding device.

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This proved to be both a costly and a dangerous situation and the need for a workable sander was so keenly felt by Werner Transportation Company, that several years ago we attempted to rig up our own outfits—wooden boxes loaded with treated sand and an intricate set of levers to expel the compound onto the roadway. Our efforts along this line proved in vain, however, for the outfits were inadequate and failed to meet our needs.

In 1944 the electric type of sander came to our attention and seemed to be a possible answer to our problem of insufficient traction. We immediately installed several on our fleet units and, as a result, we now have this equipment as standard on all of our trucks and tractors. We credit the electric sander with the remarkable time-saving we have achieved and also with the fine reduction in accidents.

We feel also that the morale factor is one of great importance in installing sanders on our units. Drivers now have no fear of the iciest of highways and our men consider the sander an absolutely essential piece of equipment. Operation is a simple matter of reaching directly in front to the instrument panel, and flipping a switch which has purposely been placed in a convenient spot. In addition, a small pilot-light tells the operator whenever sand is being released under his drive wheels.

Maintenance of the electric sander has been negligible to date, as we rarely experience any breakdowns and find only minor adjustments necessary. In fact, we have never had a unit completely fail, despite the heavy usage we give them during bad weather months.

The design of the entire unit which we are using assures prompt release of the sand at a touch of the switch and the hoppers are so constructed that the sand stays dry and flows freely at all times and under any weather conditions.

We have found the sander a convenience and a time-saver in many different situations and under varied conditions, but we feel that its use in enabling our vehicles to safely and quickly traverse icy inclines, more than justifies the installation of this type of equipment.

Designed primarily to prevent sliding and skidding on icy highways, the electric sander which we are using is made of heavy-gauge steel. The hoppers, or sand containers, are lined with a special compound to eliminate condensa-

(*Please turn to page* 164)

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AMERICA'S FINEST SPARK PLUG

- **The Massive, oversize construction guarantees extra efficiency.**
- **The Heavy Duty Insulator is bigger and stronger . . . it will not crack "when the heat is on."**
- **The Heavy Duty Electrodes are huskier . . . for longer life, with fewer adjustments.**
- **The Controlled Heat Zone insures uniform operation. It provides a definite path for controlled heat dissipation.**

BLUE CROWN DEALERS SELL MORE SPARK PLUGS . . . MAKE MORE PROFIT PER PLUG

Dealers sell more BLUE CROWN "HUSKIES" because they are easier to sell . . . have more talking points, more important features . . . give better and longer service . . . make friends who tell others. The controlled heat zone, electrode expansion space, "waist" threading and cementing of electrode are exclusive advantages obtainable only in "Huskies."

In addition to the strong selling features, the dealer set-up has been carefully worked out to give the dealer a better, fairer profit margin in return for his selling cooperation. *At this time of high overhead expense, the extra profit on BLUE CROWNS is welcomed by smart dealers everywhere.*

Sold only through Jobbers

DOMESTIC SALES
BLUE CROWN SPARK PLUG CO.
a DIVISION of MOTOR MASTER PRODUCTS CORP.
1800 WINNEMAC AVENUE, CHICAGO 40, ILLINOIS

EXPORT SALES
Borg-Warner International Corp.
CHICAGO 4, ILLINOIS U. S. A.
Cable Address "BORINTCO"

TEN SUGGESTIONS for IMPROVING the DRIVER'S COMFORT

ANOTHER S.A.E. ANNUAL MEETING PAPER IN WHICH THE AUTHOR SUGGESTS BETTER SEATS, VISION, VENTILATION, Etc.

By O. F. Quartullo,
Visioneering Company, Inc.

INASMUCH as driver comfort of the present passenger-car is nearing perfection, and the truck driver has been so sadly neglected, I will confine my remarks mainly to the comfort of the *truck* driver, wherein there is much need for improvement.

Now why has the truck driver been subjected to the discomforts that are not present in the passenger-car? It surely isn't because the engineers that design trucks are not capable of doing as good a job as the passenger-car engineers; rather, it has been due to an evil that has existed as far back as I can remember, and little has been done to correct the situation. The reasons for this condition I attribute to the following:

(1) That as a rule, production is so small on most truck models that it does not warrant the proper and necessary tooling and production fixture costs that are necessary to produce a comfortable cab.

(2) Except for some cab - over - engine models that have been produced, the driver is forced to sit in the wrong position in relation to the proper driving functions that he has to perform. This primarily is due to the location of the steering-gear, and as we all know, the majority of the truck makers have purchased the steering-gear mechanism from a steering-gear manufacturer. This is somewhat standard, and in the past it has been mounted on the inside of the main frame, and therefore, inasmuch as the driver has to sit in back of the steering-wheel, the driver has been sitting toward the *center* of the cab instead of out to the extreme left side, where he should be, in order to operate and see properly, both while he is driving forward and especially so when he is backing up with a tractor-trailer or a standard body. It has been my experience that the driver should be sitting to the extreme left and, by putting his head out of the window, he should have an unobstructed view of the rear of the vehicle that he is controlling.

(3) The transmission manufacturer has been somewhat in the same predicament, due to slight additional costs in the production of a transmission that would have remote controls, or controls that would be in the proper place for the convenience of the driver. In most cases the controls for the gear-shift levers have been in the center of the vehicle, and therefore the driver has been placed in the wrong position, instead of out to the left-hand side where he belongs.

As an example of what I am trying to tell you, visualize the engineer in a locomotive. He has a clear view ahead of him and a clear view completely to the rear of the train. I feel that inasmuch as a vehicle is operated on a highway and that the steering and control of a vehicle is a much harder problem than the engineering of a train, the truck driver should have better vision than the locomotive engineer.

Now I know that to attain these above changes it naturally entails some engineering and a possible slight additional cost, but I believe that it can be accomplished, because I have built several models where the driver sits to the extreme left side of the vehicle, and I feel that there are definite advantages that should not be overlooked in the future cab.

(4) Now for the matter of vision, again I know that some cab designs have been hampered by the fact that safety glass has not been available in widths greater than approximately 28 inches, and again due to the inability of being able to use the glass sizes that the engineer would like to have, he has been penalized in his design by being forced to use whatever size of glass he could obtain without cost penalty, and that this condition is because the passenger-car users have somewhat standardized on approximately 28-inch safety glass.

(5) On the matter of seating, I think that here is where the greatest improvement can come for driver comfort. As we all know, the average seat that goes into a truck does not cost more than between $13 and $16, and still with the small production that the truck companies have, the engineer has been called upon to be a wizard or magician to produce a seat to handle variable weights and variable sizes under severe riding conditions, and a seat on which, in some cases, a man sits for 8 to 10 hours. Perhaps it has been im-

(*Please turn to page* 174)

TRY A Dayton FAN BELT ON YOUR *Speedometer!*

There are a lot of things we could tell you about the superiority of Dayton Fan Belts . . . about their cords, specialized rubber, fabric, and so on. But in the end you will judge them on the number of miles they will roll up on your speedometer. We, too, prefer to rest our story right there.

That's why we suggest you buy a few Dayton Truck Belts for replacement. Put them on, keep track of the mileage and see for yourself how good they are. The speedometer will tell you, for us, far more than we could begin to say.

Dayton, the Original Equipment Belt, is sold through jobbers everywhere. Why not phone for a few right now?

THE DAYTON RUBBER MANUFACTURING COMPANY

Dayton 1, Ohio

TRUCK BELTS *by*

Dayton Rubber

LEGISLATIVE OUTLOOK for 1946....

STATES May PROPOSE TAX INCREASES to MATCH FEDERAL AID on 50-50 BASIS — ALL EYES on KENTUCKY SIZE-WEIGHT FIGHT — EIGHT REGULAR SESSIONS SCHEDULED

•

By Arthur C. Butler

Managing Director,
National Highway Users Conference

EIGHT State Legislatures meet in regular session in 1946. They are: Kentucky, Louisiana, Mississippi, New Jersey, New York, Rhode Island, South Carolina and Virginia. It is expected, however, that a number of legislatures in other States will convene in special sessions, to consider methods of speeding-up recovery from the effects of the war.

The Federal-Aid Highway Act of 1944 authorized an expenditure of $500 million a year for the first three post-war years, to be matched by the States on a 50-50 basis. This authorization is generally referred to as a three-year program, but both Federal and State officials recognize that the planning, acquisition of rights-of-way and construction of such a program probably will take more than three years.

Official spokesmen in some states have indicated that motor vehicle tax increases will be advocated to provide funds for matching Federal Aid under this program.

Preliminary steps are being taken to break down highway barriers through adoption of motor vehicle reciprocity legislation.

Size-and-Weight Battle in Kentucky: Size and weight limitations will be under consideration in several of the States that meet in 1946. Highway users all over the nation will focus their attention on the 1946 Kentucky session, where determined efforts will be made to liberalize that State's motor vehicle size-and-weight limitations. Kentucky's restrictions are now the lowest in the nation.

Other highway-user matters expected to be prominent in 1946 include speed limits, financial responsibility, increased regulation of motor carriers, and highway safety legislation.

State-by-State Forecast: A detailed state-by-state list of prospective legislative issues, as reported to National Highway Users Conference, follows:

Kentucky—Bills will be introduced to increase sizes and weights and to provide reciprocity; Highway Commission may insist on right to designate highways that can carry heavier weights. Higher registration fees for all classes of trucks, except those operating in cities, are expected to be advocated.

Louisiana—A gasoline tax increase probably will be proposed. The Governor contends additional funds are necessary to match Federal-Aid. An anti-diversion constitutional amendment also may be considered.

Massachusetts—The Governor is expected to urge an increase in the gasoline tax. This proposal was defeated in the last legislature. An anti-diversion constitutional amendment has been proposed for several years, but always has been defeated.

Mississippi — Mississippi highway users favor a general downward revision of commercial motor vehicle license fees, to make them more nearly comparable with those of other states. A measure will be introduced to provide 18,000 lbs. axle weight, gross weight of 45,000 lbs. and an increase of length for tractor-semi-trailers from 40 to 45 feet. Another proposal will authorize the present Mississippi Committee on Reciprocal Agreements to enter into full reciprocity with other states. The state may have the problem of financing its post-war highway program and a gasoline tax increase probably may be advocated. A Legislative Investigating Committee has drafted a bill proposing registration fees that are considerably above those of surrounding states.

New Jersey—For the past two years there have been threats of increased registration fees, and such a measure may be introduced in 1946. A resolution also may be considered for a study of motor vehicle taxes in the state. Atlantic City's Planning and Improve-

(*Please turn to page* 176)

*Porous Chrome**

PISTON RINGS

an exclusive American Hammered development

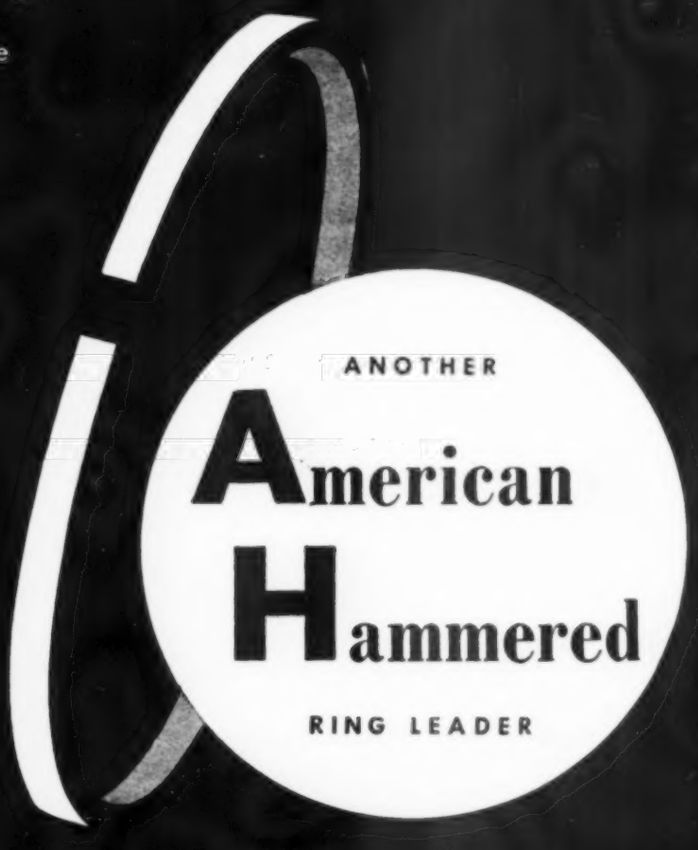
American Hammered developed the application of porous chrome to piston rings and set a new standard for engine performance. Road tests covering more than seven million miles—in all types of bus and truck engines, in all types of service—established these facts: American Hammered Chrome piston rings . . .

Quadrupled the time between engine overhauls

Kept oil consumption lower for a longer period

Reduced cylinder wear as much as one-third of what is considered normal

FOR THE FLEET OPERATOR, this adds up to big savings in operating and maintenance costs, and the elimination of much of the down-time that cuts into your profits. *Your American Hammered jobber is prepared to serve you with Porous-Chrome Piston Ring Sets.*

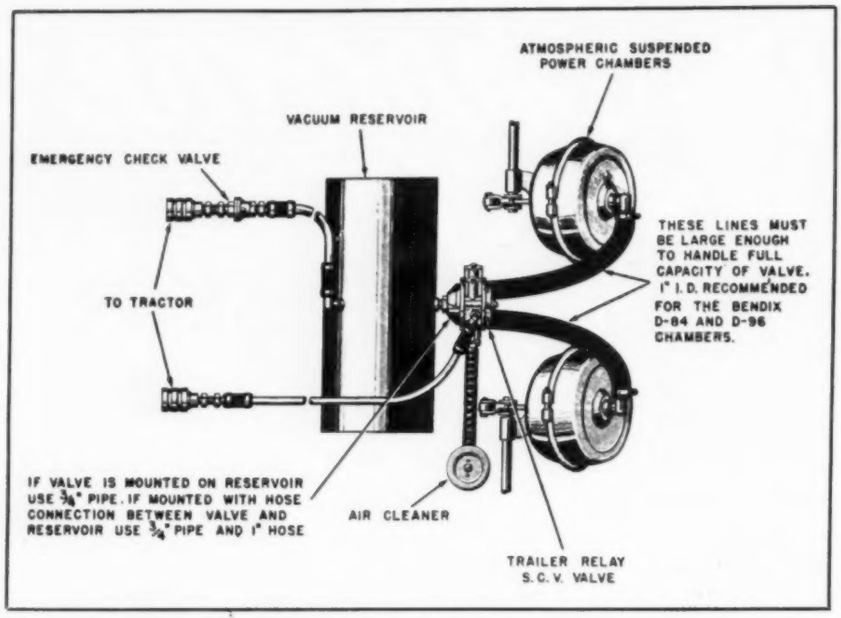


Van der Horst process . . . first applied to piston rings by American Hammered.

Koppars Company, Inc., American Hammered Piston Ring Division, Baltimore, Maryland

American Hammered Piston Rings

A KOPPERS PRODUCT


ATMOSPHERIC SUSPENDED POWER CHAMBERS
VACUUM RESERVOIR
EMERGENCY CHECK VALVE
TO TRACTOR
THESE LINES MUST BE LARGE ENOUGH TO HANDLE FULL CAPACITY OF VALVE. 1" I. D. RECOMMENDED FOR THE BENDIX D-84 AND D-96 CHAMBERS.
IF VALVE IS MOUNTED ON RESERVOIR USE 3/8" PIPE. IF MOUNTED WITH HOSE CONNECTION BETWEEN VALVE AND RESERVOIR USE 3/4" PIPE AND 1" HOSE
AIR CLEANER
TRAILER RELAY S.C.V. VALVE

THIS is a typical tractor-trailer installation, showing the location of the new fast-acting relay valve, its location and the proper size of connecting fittings and tubing.

HOW YOU CAN IMPROVE "SLOW" TRAILER BRAKES

BENDIX ENGINEERS SUGGEST INSTALLATION OF NEW, FASTER-OPERATING RELAY VALVE

THE importance of synchronizing tractor and trailer brake operation on vehicles equipped with vacuum power braking, has long been recognized by engineers and practical fleet operators. The subject comes into new prominence today because of improvements in the operation of vacuum power brakes on tractors.

When improved vacuum power equipment is added to the brake system on the tractor, or when new tractors are used with old trailers, there may be an appreciable time-lag in the application of the trailer brakes with respect to the tractor.

This time-lag often results in the tractor doing more than its share of braking, thus increasing tractor brake maintenance, and a generally unsatisfactory operation of the tractor-trailer combination, from a brake standpoint. If the condition is severe, there will be a tendency to brake too hard and a real hazard to safety may be introduced.

When the vacuum power braking equipment on the tractor is overhauled, or is modernized by changing over to a faster operating hydraulic-vacuum unit, it is highly advisable to check the synchronization of the trailer brakes.

The first thing is to be sure that the vacuum power brakes on the trailer are operating up to their original efficiency. Binding in mechanical levers or links, due to rust, dirt or misalignments; restrictions due to collapsed hose or kinked tubing; leaks in fittings or connections; sticky, leaking or inadequate trailer valves; worn brake linings; damaged power chambers; and worn valve parts—are among the things to look for.

It is likely to be found, however, that the original trailer brake system is too slow to work satisfactorily with the improved tractor equipment. The remedy is to put a faster operating relay valve on the trailer.

Such a valve should have large ports and air passages which speed up brake application on the trailer, so that the lag between the application of the brakes on the two vehicles is reduced to a minimum. A typical valve of this type is the new trailer valve manufactured by Bendix and identified in their B-K line as the SCV valve.

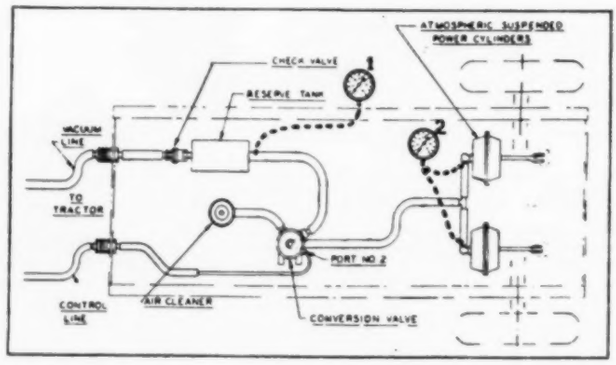
When such a larger capacity trailer valve is installed, it is important that the hose lines leading from the reservoir tank to the trailer valve, and from the trailer valve to the trailer power chambers, be large enough to handle the volume of air without restriction.

There is no advantage in putting on a larger capacity, faster-acting trailer relay valve, if the hose connections from that valve to the power chambers constitute a bottleneck that offsets the advantages of the new valve. In the case of the largest size Bendix valve, the manufacturer recommends that the hoses from the reserve tank to the valve and from the valve to the power chambers, be not less than 1" inside diameter, for a typical installation.

The next point is to be sure that the fitting leading into the power chamber has an inside diameter of not less than 1". It is obvious that a smaller fitting than this will, in itself, constitute a restriction.

The rate of air flow into and out of the power chamber can be no faster than that permitted by the smallest cross-sectional area that occurs in the vacuum lines. It is another application of the old principle that a chain

(*Please turn to page* 176)



HERE's a test set-up for testing trailer vacuum brakes, when the atmospheric-suspended system is used. . . . If two or more power cylinders are used, test each separately, as shown with Gauge No. 2.

Another REPEAT ORDER *from the* EMPIRE STATE...

. . . THE 4TH REPEAT PURCHASE OF FWD TRUCKS BY NEW YORK STATE

Repeat purchases by satisfied owners testify, more than any other endorsement, to the merit of a product.

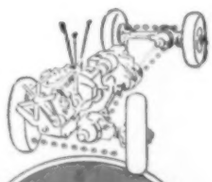
Here is a typical repeat purchase history:

Only a short time ago 37 FWD Model YU four-wheel-drive trucks were added to the fleet owned by New York State. This was the fourth repeat purchase by the Empire State, bringing its present FWD fleet total to 157 trucks. Significant, too, is the record of two famous FWD trucks: —

— the FWD Model SU which, in less than four years time, won the endorsement of motor truck buyers as expressed in $75,000,000.00 worth of purchases of this single 5 ton model.

— the FWD Model HAR 3 ton which achieved the phenomenal total of $50,000,000.00 in purchases in an equally brief period of four years.

Because of merit . . . because of proved-in-service performance, owners buy FWD trucks again and again. A nation-wide survey, recently completed, reveals that 94% of these owners have definitely stated that their next truck purchase will again be *FWD*.



FWD TRUCKS

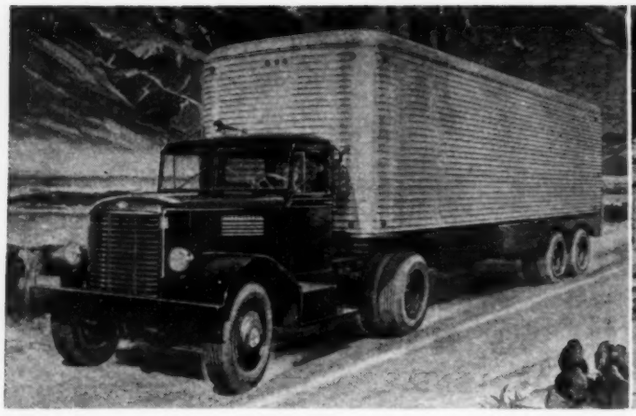
THE ORIGINAL EXCLUSIVE BUILDERS OF FOUR-WHEEL-DRIVE TRUCKS

THE FOUR WHEEL DRIVE AUTO CO.

Clintonville, Wisconsin

Canadian Factory: KITCHENER, ONTARIO

One of the trucks on the recent purchase of 37 FWD Model YU's by New York State.

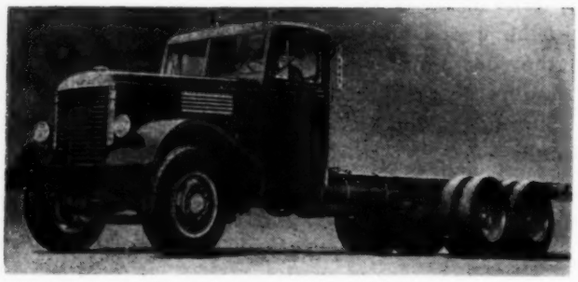


NEW IHC Model W-3042-H, 30,000-lb. gvw. highway transporter.

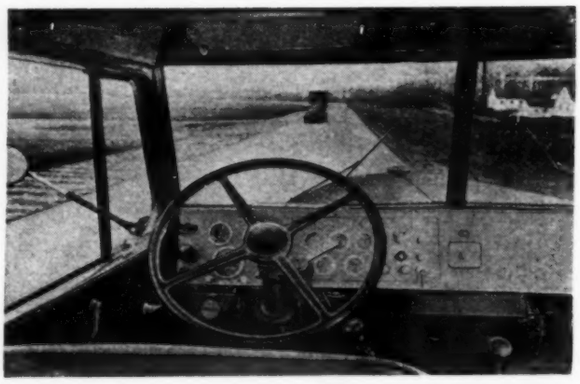
THE new Model W-4064-H, 40,000-lb. 6-wheel highway transport.

I.H.C. OFFERS "WEST COAST" MODELS

THE International Harvester Company's motor truck division unveiled its new line of heavy duty West Coast trucks last month, in special showings held in several West Coast cities. The new models, soon to go into production at Harvester's newly - acquired Emeryville, Calif. plant, are designated as IHC "Western Freighter" highway transport models W-3042-H and W-4064-H, and have g.v.w. ratings of 30,000 and 40,000 lbs. respectively. The gross train weight ratings of both models are said to permit their use within the weight and length restrictions of all states in which vehicles of this type are legal and practical.



THE chassis and cab of the Model W-4064-H tandem axle job.



VIEW of cab interior, showing controls and good visibility.

The model W-3042-H is a 4 x 2 job—a 4-wheel vehicle which drives on the two rear wheels. This unit was displayed at the Denver showing with the standard power-plant, the International-Continental S-6749 gasoline engine. This 749 cu. in. displacement engine, which develops 254 brake h.p. at 2,600 r.p.m. and 585 lb.-ft. of torque at 1,400 r.p.m., is said to have been war-tested in a high-speed, 13-ton prime mover and to deliver economical performance with dependability. This engine is of the valve-in-head type, with 5⅜" bore and 5½" stroke, compression ratio of 6.5 to 1, and embodies such features as replaceable dry cylinder liners, 2-piece head and heavy-duty 7-bearing crankshaft.

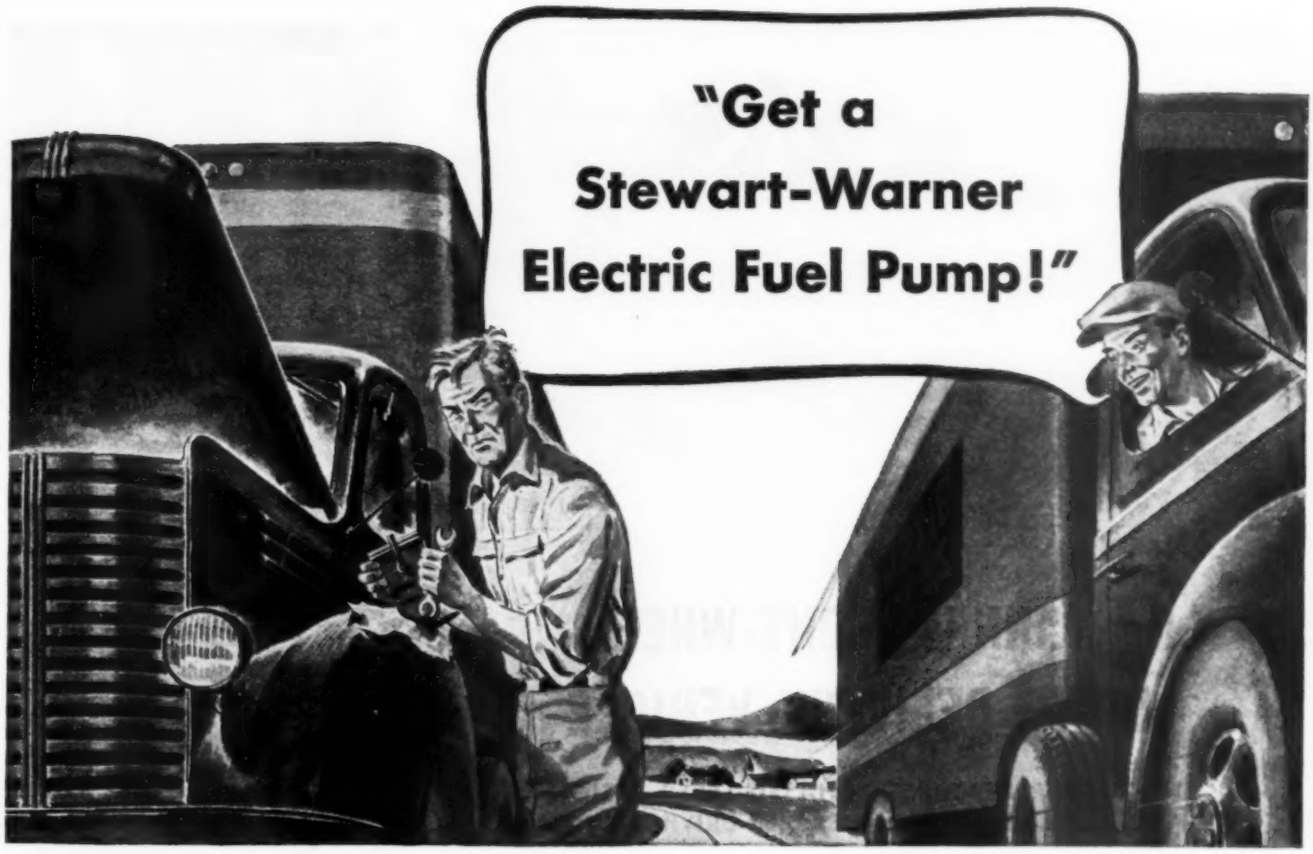
The W-4064-H is a 6 x 4—a 6-wheel vehicle on which the power is applied to the 4 rear wheels. The chassis shown at Denver was powered by one of the five optional engines available in these new Internationals — the Cummins Diesel NHB-600.

Other super-heavy-duty Internationals to be produced at the Company's Emeryville Works, where production will start in February, include the off-highway models, W-4042-OH, W-4564-OH, W-6564-OH, and W - 9064 - OH, which have gross vehicle weight ratings of 40,000, 45,000, 65,000, and 90,000 pounds respectively.

Although the International-Continental S-6749 engine is listed as standard, all six of the new International West Coast models are available with any of the following optional engines: the Cummins Diesel HB - 600, NHB-600, and NHBS-600 (supercharged); and the Hall-Scott HS-400 (gasoline), according to International Harvester engineers.

Clutches in these heavy-duty Internationals are of the 2-plate type, 14-inch diameter, with all engines except the NHBS-600 and the HS-400, with which 15½-inch clutches are used. A selection of six Spicer heavy-duty transmissions, of both four and five-speed types, is available to meet specific requirements. Optional equipment also includes a choice of four 3-speed Spicer auxiliary transmissions of either the direct or over-drive type.

(*Please turn to page* 181)



AVAILABLE NOW! End Vapor-Lock and Fuel Pump Failure that Cost You Money and Time!

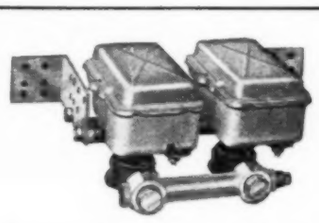
Doesn't beat itself to death. Operates only when needed. Delivers 15 gallons per hour on an average of one ampere of current.

• Get yours *now!* This famous fuel pump pushes fuel to the carburetor under constant pressure. In so doing, it eliminates vapor-lock by pushing the vapor pocket out of the fuel line.

It's a "smooth operator"—doesn't pound or beat itself to death—lasts longer with less maintenance. And the diaphragm of tested and proved Du Pont Fairprene simply won't wear out.

There's no fire hazard. Stewart-Warner contact points are sealed in a hydrogen filled tube and are operated and controlled magnetically. The hydrogen keeps the points cleaned automatically—greatly reduces burning, sticking and pitting. This exclusive feature is approved by Underwriters' Laboratories.

Install Stewart-Warner Fuel Pumps as replacements or as auxiliary "safety" pumps for heavy-duty operation. No rotating parts, no piston, no bearings to fail. Stewart-Warner Corporation, 1831 Diversey Parkway, Chicago 14, Illinois.

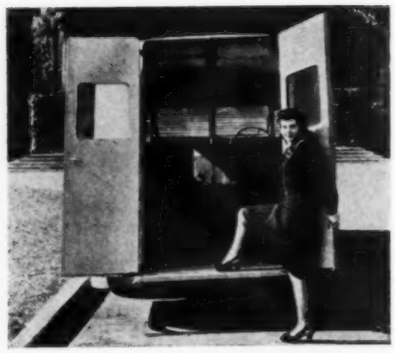


• Use Stewart-Warner Dual Electric Fuel Pumps where gas cousumption is high—gas mileage lower than average. Dual pumps more than double the life of each pump. Can be installed so that each pump operates independently.

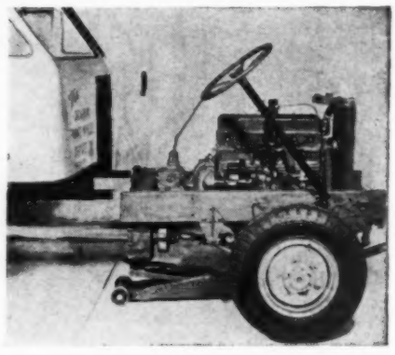
STEWART-WARNER
ELECTRIC FUEL PUMP
STEWART-WARNER CORPORATION

STEWART WARNER

THE new Linn Delivery Coach is a 1½-tonner and is built on a wheelbase of 138 inches.



THIS view shows the 16-in. floor height and the large door opening at the rear.



THE complete power-plant sub-assembly is easily removed from the body-chassis frame.

New LINN is FRONT-WHEEL--DRIVE DELIVERY VEHICLE

1½-TONNER FEATURES "CHASSIS-LESS" DESIGN AND EASILY-REMOVABLE POWER-DRIVING UNIT

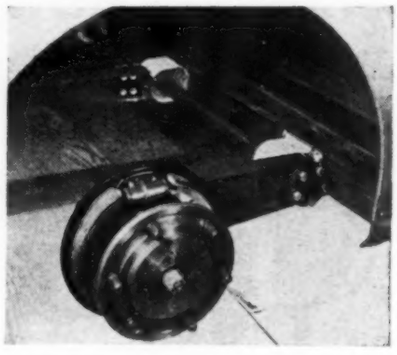
THE Oneonta Linn Corporation, Oneonta, N. Y. is currently announcing a brand-new truck known as the "Linn Front-Wheel-Drive Delivery Coach". The five photos on this page should serve to give you a pretty good idea of its construction; from them you will no doubt observe that it features a number of "unconventional" enginering details.

First, the fact that it is a front-wheel-drive job marks it as being "different". Then there is the trussed tubular steel frame, which eliminates the chassis as we have come to know it, and follows what they call "monocoque" form. The method of attaching the rear wheels, too, as shown in one of the pictures, is somewhat different. Since these wheels are simply load-carrying members, and have no driving to do, they are mounted on what is called a "torsion-bar", said to be similar to that used by Army tanks. The springing effect is provided by what appear to be springs coiled around the bar that runs across the chassis, as shown in the picture.

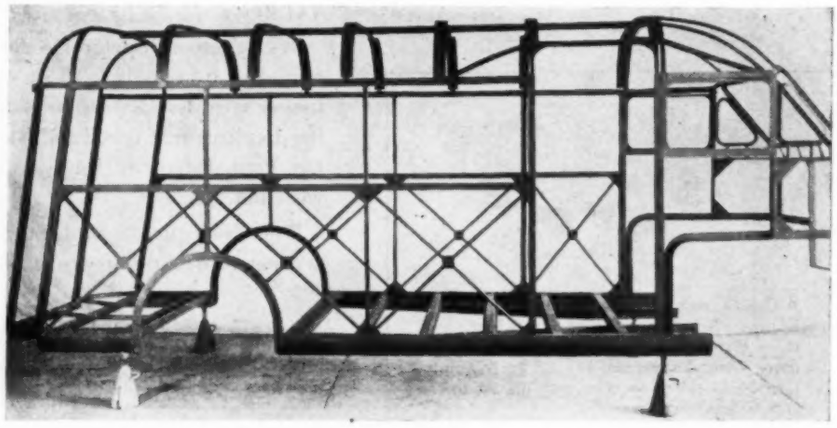
Before going into any more constructional details, here are some brief specifications: The job is rated by the maker as a 1½-tonner, and is powered by a "standard" engine, such as Hercules, etc. (In the picture a Chevrolet engine is shown). The standard wheelbase is 138 inches. With standard 14-foot body, as shown in the picture, the weight of the vehicle is 5,010 lbs., when aluminum sheeting is used over the tubular steel frame.

The engine is mounted on a light-weight sub-assembly frame, as shown in the picture, together with radiator, clutch, transmission, silent-chain transfer case, drive-line and axle. All of these are standard, production-run units. This is said to make up a compact, easily-removable unit that delivers a high

(*Please turn to page* 176)



REAR wheels do no driving and are mounted on this torsion-bar type of suspension.



HERE is the trussed tubular steel frame, which eliminates the separate chassis frame.

The General Highway Truck Tire and

GENERAL'S EXTRA-MILEAGE PACKAGE

The scientific tire maintenance method!

FIRST—General designed an extra heavy duty tire—the General Highway Truck Tire—with three exclusive construction features that make it "shock-absorbing" . . . stronger, more flexible . . . capable of delivering *more original miles* . . . standing up for *more recap miles.*

SECOND—established with General Tire Dealers . . . coast-to-coast . . . a *scientific* tire maintenance and recapping service that protects tires from the first mile—to provide you with a complete technical tire service that *assures* delivering *more original miles . . . more recap miles.*

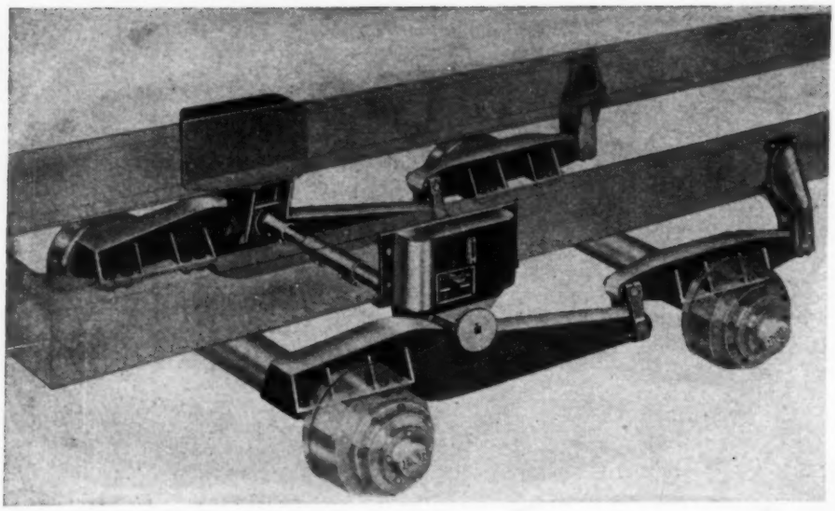
COMBINE the Top-Quality construction "extras" of the General Highway Truck Tire with General's complete scientific tire service and you can enjoy America's lowest tire cost per ton mile.

The GENERAL *Highway* TRUCK TIRE

- **Impact-Cushioned Shoulder**
- **Stress-Proofed Tread**
- **Shock-Conditioned Carcass**

THE GENERAL TIRE & RUBBER CO., AKRON, OHIO

MORE original MILES • MORE recap MILES



HOW the new suspension is attached to the frame at two points. The two coil springs are contained in the "housing" attached to the frame, shown just forward of rear axle.

NEW TRAILER SUSPENSION USES TWIN COIL SPRINGS

"FEATHER RIDE" TANDEM AXLE for TRAILERS PROVIDES for EMPTY or FULL VEHICLE LOADS

A NEW type of trailer suspension called "Feather Ride" has recently been announced by a Pacific Coast manufacturer, Feather Ride, Inc., Portland 5, Ore. It is a tandem axle design featuring encased coil springs mounted on the chassis frame, an ingenious leverage hook-up, visual load indicator and a simple mechanical snubbing device. The complete suspension, illustrated above, is rubber-bushed and rubber-mounted throughout, thus eliminating the need for lubrication. Rated capacity is 17,000 lbs. per axle, or 34,000 lbs. for the tandem axle assembly.

As shown in the lower illustrations on this page, each coil spring assembly consists of a pair of "main" springs and a pair of "underload" springs, which fit inside of the main springs, connected by a cup-like device. When running empty, the soft-acting underload springs support the chassis and body; when running loaded, the main springs do the work.

Located between each pair of coil springs, in the same housing, is the snubbing device or "ride control". This is described as a "frequency snubber", consisting of three metal shoes which slide up and down within a tapered cylinder. Upon impact, these shoes are expanded against the sides of the tapered cylinder by wedge action, and after thus resisting the spring action, they are returned to their normal position by an inner coil spring, and are ready to act again. This device requires no lubrication and its life, without service attention, is given as a half million miles.

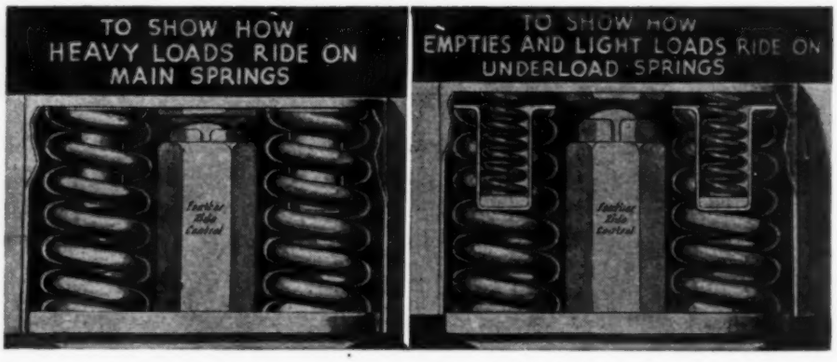
Additional features pointed out by the maker include a saving of hundreds of pounds of weight over conventional springing methods, complete elimination of axle kick-up on fast stops, an automatic steering feature that is said to greatly ease tire scuffing on curves, and complete interchangeability among the few types of parts. The load is carried 25 percent by the front bracket and 75 percent by the rear bracket of the tandem assembly.

An interesting explanation of the "complete elimination of axle kick-up on fast stops" is given. Feather Ride engineers declare that this new suspension actually converts the force of "momentum" into additional tractive effort between the tires and the ground. Since the load is suspended in front of each axle center line, it provides a "bell-crank" effect, and upon application of the brakes, each axle "twists" this bell-crank in a rotary motion, resulting in a downward-pull effect at each point where the bell-crank supports are attached to the frame.

Thus, the greater the speed, the engineers say, or the greater the load, momentum or brake application, the greater is the kinetic energy available and the greater becomes this downward-pull. It is claimed that the "settling" of the load can be visually observed upon a severe application of the brakes, with this suspension, and that this ability to make fast emergency stops without "tire hopping", is a considerable tire saver and adds greatly to the safety factor.

The rubber mounting of the entire lever and axle assembly makes it easier to "pull" a trailer equipped with the Feather Ride suspension, because it allows the axles to "give" sideways under the frame, and to conform to the arc of curves, according to the engineers, after which the axles return to their normal trailing position, in relation to the king-pin and frame.

(*Please turn to page* 179)



THE main feature of the new suspension consists of the double twin coil springs. The snubbing device or "ride control" is contained in the hex chamber between the springs.

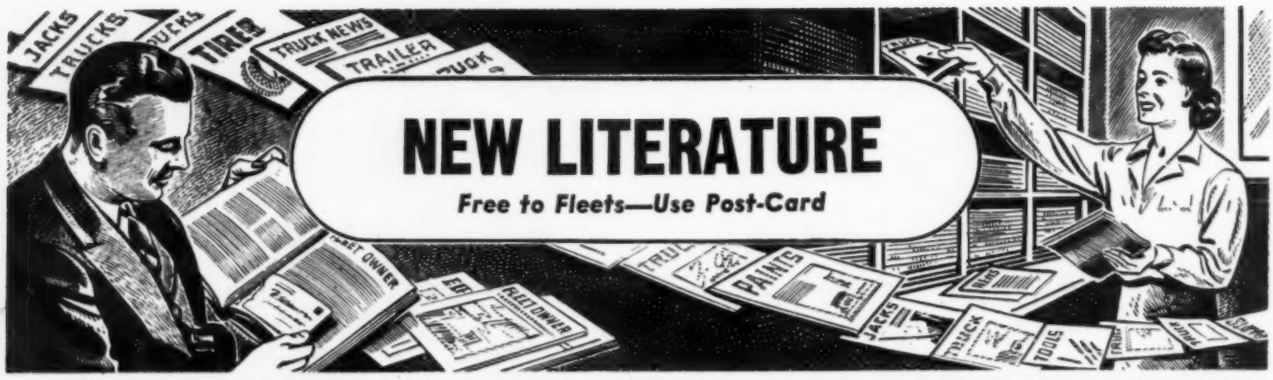
"Thermoid Brake Linings give longer life and more satisfaction than any we have used"..

THE Melvin Trucking Company, of Illinois, operates two hundred and forty-five truck and semi-trailer units. They cover over 6,000,000 miles a year, through the states of Illinois, Indiana, Iowa, Wisconsin, Missouri and Kentucky. All of which adds up to a lot of wear and tear on brake lining. Melvin Trucking Company specify Thermoid Brake Lining for all of their units. They have been using Thermoid Products for over 8 years, so that when they say: "Thermoid Brake Linings give longer life and more satisfaction than any we have ever used," they speak from experience. You'll have the same experience when you test Thermoid Products on *your* fleet. Why not give them a trial?

Thermoid

Custom-Built Brake Lining Sets • CBB Sets • Thermo-Blocks for Heaviest Duty

THERMOID COMPANY • TRENTON, NEW JERSEY



NEW LITERATURE

Free to Fleets—Use Post-Card

341. How "Surface Chemistry" Speeds-Up Engine Overhaul

What is "Surface Chemistry"—you may ask? . . . It's just the simple changes that occur when a cleaning compound "eats away" dirt, grease, sludge, gum, etc. . . . Here is an 8-page, fact-filled booklet which illustrates and describes how new type cleaning materials can speed-up and simplify engine overhaul—especially Diesel engines. . . . It also shows several labor-saving, chemical short-cuts which are said to be fast, simple methods of removing carbon, grease, oil, asphalt, tar, etc. . . . Also how to de-scale cooling systems, how to remove paint and prevent rust; how to prepare metal surfaces for new paint coatings that will stick—and others. . . . Use the post-card, mark No. 341 if you want this booklet, and it will be mailed to you promptly and free.—(*Turco*).

•

342. What You Can Do With Flexible-Shaft Equipment

This is a 6-page broadside, 8½" x 11", which illustrates and describes a line of portable flexible-shaft equipment for fleet body-and-fender and tire shops. . . . In addition to showing several ways in which this type of equipment can be used to advantage, the broadside shows four available models and an interesting assortment of attachments, such as brushes, buffers, polishers, sanders, rotary files, angle-head adapters, etc. . . . Number 342 on our post-card brings this promptly, by mail.—(*Haskins*).

•

343. "Short-Cut to Effective Truck Body Advertising . . ."

We all know that our vehicles are "rolling billboards". . . . This 8-page booklet bears the above title and demonstrates how fleets can make their trade-marks *sell* their products, through the simple application of "*Slide-Off*" decal transfers. . . . The booklet is chock-full of samples of decals used by leading companies, in full colors. It provides an introduction to the subject—if you never have used decals; it brings you up-to-date on a late type—if you have used 'em before. . . . Number 343 on our post-card and a copy comes by mail.—(*Palm Brothers*).

USE THE POST-PAID POST CARD

344. "Guide to Better Truck and Bus Lubrication. . . ."

"*Truck and Bus Lubrication*" is the title of this 40-page brochure—a useful book to those directly responsible for vehicle operation, which promises to save time, trouble and expense. . . . It aims at a better understanding and solution of lubrication problems in the truck and bus fields. . . . It discusses such vital subjects as specific lubrication requirements; causes of motor oil deterioration in service, and preventive measures; characteristics of motor oils and greases; and proper selection for correct lubrication of all parts. . . . Sent *free* to truck and bus operators who mark No. 344 on our post-card.—(*Sinclair*).

•

345. Offers Valuable Booklet on Materials-Handling Methods

The title of this booklet is "*Clark Carloader Method*". . . . It is a book which is said to have revolutionized materials-handling, and out of which has stemmed the materials-handling principles and methods that have enabled the Army and Navy to successfully handle the burden of supplies, munitions and equipment. . . . If you have a materials-handling problem in connection with your fleet, it should be interesting. . . . Number 345 brings a free copy by mail.—(*Clark*).

•

346. Two Booklets on Causes of Low-Temperature Sludge

Last year we offered in this department a 12-page booklet, "*Low-Temperature Sludge*", which was a duplicate of an article we published, the booklet being offered for handy reference. . . . This month we offer a sequel to it, by the same authors, covering "*Further Studies on Low-Temperature Sludge*". . . . The text of this booklet is essentially the same as the article appearing on page 78 of this issue. . . . The Texas Company has ear-marked a number of copies of *both* booklets, which will be sent *free* on request. . . . Just mark No. 346 on our post-card and they will be mailed promptly.—(*Texas Co.*).

•

347. "The Record of Rayon Cord in Tires"

Above is the title of a new, free booklet. . . . It gives dozens of interesting facts about rayon cord that are said to make clear its importance in the tires of today and tomorrow. . . . This is perhaps your opportunity to get thoroughly acquainted with rayon as a tire cord material; there's lots to learn on this new subject. . . . No. 347 on our post-card will bring you a *free* copy promptly.—(*American Viscose*).

•

348. Two New Booklets on Fire Fighting, Extinguishers

Two very interesting booklets are these. . . . One is titled "*Inspection and Maintenance of First-Aid Fire Extinguishers*". . . . The other, "*How to Teach Fire Fighting*" . . . . Both are strictly educational, full of fire facts and of standard 8½" x 11" size. . . . The data on the carbon-dioxide, foam, powder and other newer types is especially interesting; we have found that there are a lot of fleet men who are not *entirely* familiar with these. . . . For your *free* copy of both booklets, just mark No. 348 on our post-card and they will be mailed.—(*Kidde*).

•

349. Condensed Catalog on Brass Fittings and Fuel Lines

Condensed into this 32-page catalog you will find a wealth of data that would ordinarily occupy a *much* bigger book. . . . It illustrates and describes flexible fuel-lines, brass fittings, fuel-strainers, dash-controls, flaring-tools, tube-cutters, etc. . . . Some 1,700 service parts and tools are included in it. . . . To mention a few more, there are oil-filter lines, shut-off valves, drain-cocks, radiator-faucets, spring-oilers, etc. . . . Now that much of this material is available again, this catalog should come in handy. . . . No. 349 on our post-card brings one, *free* and by mail.—(*Imperial*).

•

350. How to Tell Causes of Ball Bearing Failures

Was that bearing failure caused by lack of grease, foreign matter, corrosion or just a "flat ball"—? . . . Here is an 8-page booklet, 8½" x 11", just *full* of photographs of bearings that failed prematurely. . . . The title is "*How to Determine Causes of Failure by Examining Ball Bearings*". . . . More than 95 percent of all ball bearing troubles can be detected by *visual* inspection of the bearing, it is said, and this booklet tells you just how. . . . No. 350 on our post-card brings a *free* copy by mail.—(*Marlin-Rockwell*).

Look at the Records!

the best brake is AIR!

BENDIX-WESTINGHOUSE GENUINE AIR BRAKES

World's Standard of Safety!

Once a truck or bus operator installs Air Brakes his own records keep him sold. On the "credit side" of the ledger will be found faster and more dependable schedules, satisfied drivers and far safer operations.

Missing from his records will be long and costly lay-ups for brake service and repairs, resulting in lower operation cost and efficient performance standards.

Yes, records like performance prove *the best brake is AIR* and the experience of operators, dealers and manufacturers demonstrates conclusively that the best AIR BRAKE is Bendix-Westinghouse.

BENDIX-WESTINGHOUSE AUTOMOTIVE AIR BRAKE COMPANY
ELYRIA, OHIO

Bendix-Westinghouse

AUTOMOTIVE AIR BRAKES

THE battery-powered model is shown here, loading a big truck.

THIS is another view of the battery job, inside of the truck.

CLARK ANNOUNCES "TRUCLOADER"

MICHIGAN MANUFACTURER's POST-WAR MACHINE SAID to INCREASE TRUCK's UTILITY

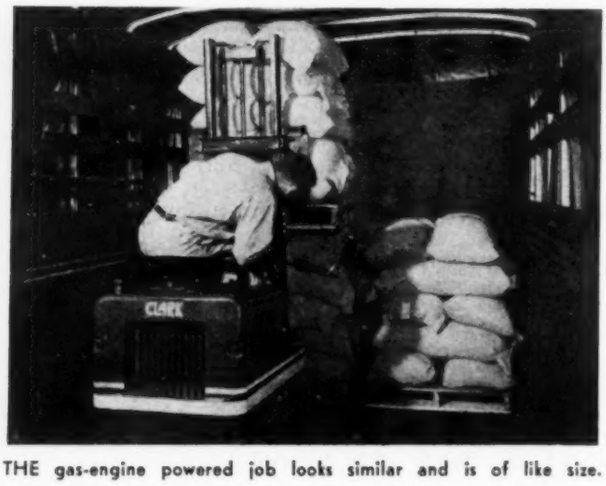
DESCRIBED as a better method destined to revolutionize highway freight handling, the "Trucloader", a newly developed product of Clark Tructractor, was introduced last month by Ezra W. Clark, to a group of civic and industrial leaders in Battle Creek, Mich., as that City's post-war product, and "a contribution to a better America."

A compact, light-weight fork-truck designed to lift, carry, stack and tier unit package loads weighing up to 1,000 pounds, and to operate within narrow limits, the Trucloader is said to be especially adapted for fast, low-cost loading and unloading of highway trucks and trailers. It is said to be maneuverable in narrow aisles and to have an exceptionally small turning radius of 57 inches. With its light weight it will run safely in and out of trucks and trailers, and can be used in elevators which cannot handle heavier, units, the manufacturer points out.

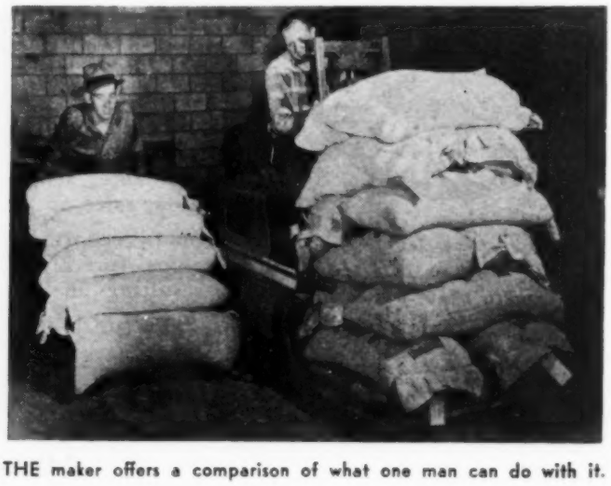
The Clark Trucloader method brings to trucking problems the same vital advantages, stated Mr. Clark, with which its predecessor, the Clark Carloader method, developed in 1937, revolutionized the handling of freight in and out of freight cars. This method reached its pinnacle of usefulness during the war, in speeding the handling of munitions and supplies in factories, supply depots, airports and export bases, for shipments to the armed forces overseas. Both methods utilize the effective principle of unit loads packed on suitably-designed pallets.

Specific benefits achieved by the Clark Trucloader, according to Mr. Clark's analysis, are a saving of more than 75 percent of man-hours required for loading and unloading highway trucks and trailers; reduction to a minimum of losses due to breakage, spoilage and pilfering; elimination of up to 90 percent of accidents and injuries with their attendant insurance cost; reduction of costly idle or "standing" time of trucks representing a 4-billion-dollar investment; and the reflection of these savings in better earnings for the

(*Please turn to page* 181)

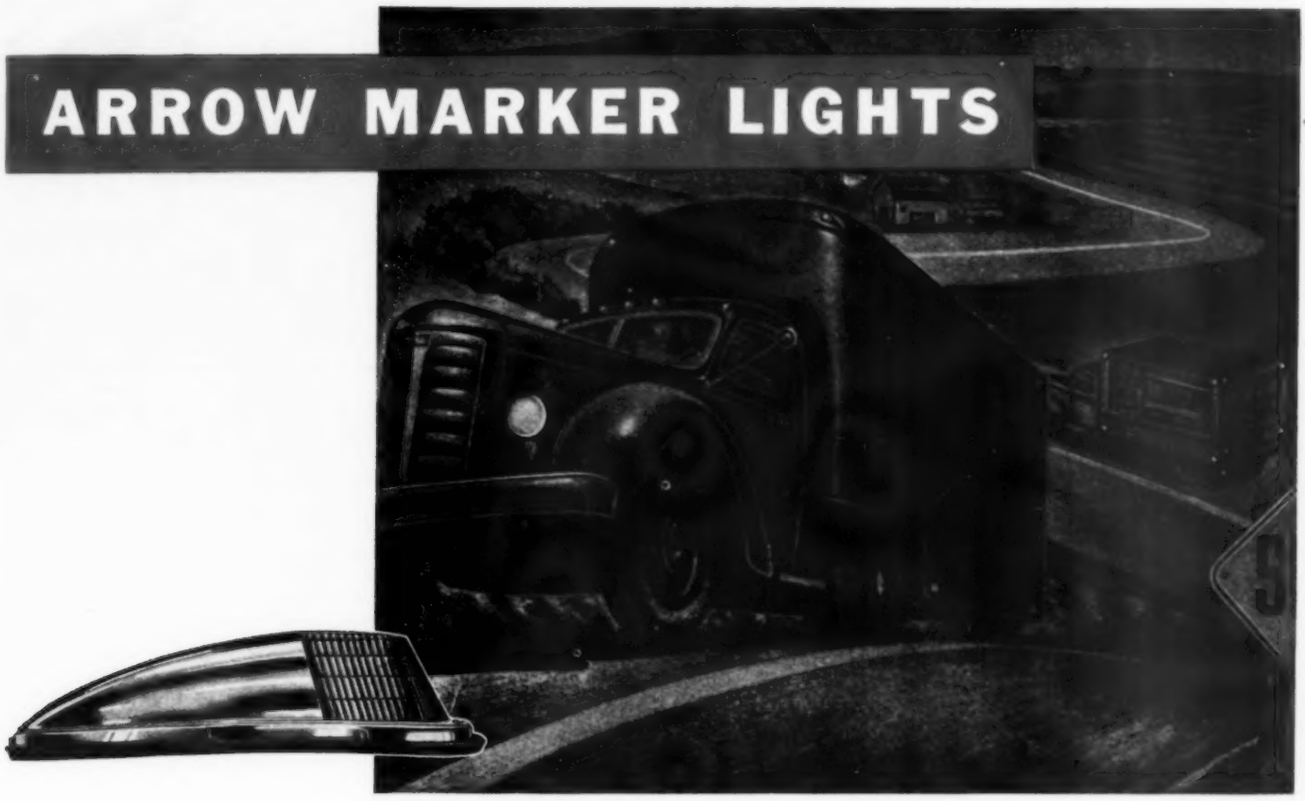


THE gas-engine powered job looks similar and is of like size.



THE maker offers a comparison of what one man can do with it.

ARROW MARKER LIGHTS



FOR EVERY VEHICLE . . . FOR EVERY USE

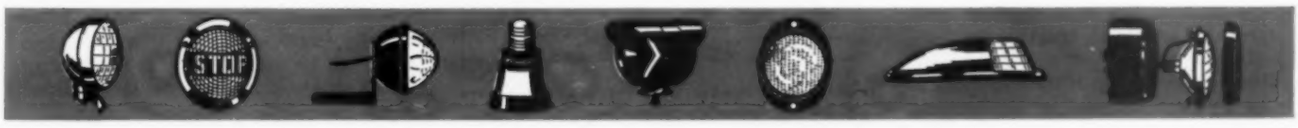
Dependable as the vast transportation system that uses them, Arrow Marker Lights help guide payloads safely and speedily to their destination.

The streamlined Marker Light illustrated above is visible from all four directions . . . front, rear, and both sides . . . and may be used on corner installations in place of two lights, conforming to I. C. C. and State requirements. Protects driver and cargo, as well as truck or bus.

There are Arrow Marker Lights designed for every conceivable purpose. They are built to stand up under the most rugged driving conditions . . . will give lasting, efficient service. Whenever owners, operators, and shop men speak of Marker Lights in terms of reliability and long life, it's 10 to 1 they're talking about Arrow!

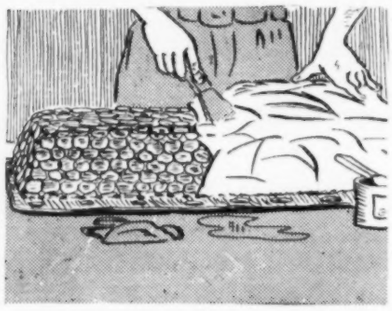
Contact your jobber salesman about Arrow Marker Lights or other dependable "safety after dark" equipment—or write direct for catalog. Arrow Safety Device Company, Mount Holly, N. J.

SAFETY ARROW DEVICES
SAFETY AFTER DARK



INSULATING OIL-PANS

● Sam Houser of the Yellow Cab Company, Omaha, Nebraska, offers this suggestion on insulating engine



oil-pans to help keep motor oil warm in cold weather:

"For some time we have used a Johns-Manville product which resembles a black meal-like powder. This is mixed with water and made to a consistency of bread dough. A wire netting is then spot-welded around the oil-pan and the "dough" is applied about one-half-inch thick and then the pan is baked in a gas oven."

This practice, it is claimed, has reduced sludge in engines to a point where it is not a problem any more, and has also increased the intervals between re-ringing jobs.

Mr. Houser also declares that improper crankcase ventilation is one of the principal causes of sludge, as well as the slow speeds and low temperatures at which many vehicles have been operated during the war period.

●

TRIED ROCK-SALT?

● Advocates of rock-salt as a snow and ice-melter, point to experiments recently conducted by the AAA at Clarksburg, West Va.

By throwing rock-salt in front of the driving wheels of vehicles stuck in snow, slush or ice, the drivers were able to haul themselves out of slippery spots without spinning tires and without calling for a tow-car. The rock-salt crystals, it is claimed, gave immediate, constant traction and enabled them to pull out promptly.

During the tests, 10-pound bags of rock-salt were carried in the test vehicles and calls for AAA towing service dropped considerably. They point out that, unlike ashes, rock-salt does not spot clothing or leave a messy residue on the pavement, and that it is safe and easy to use.

The principle is this: In addition to giving physical traction, the rock-salt crystals bore through the ice and compacted snow, forming a weak brine which undercuts them and makes complete removal easy. Advocates of this material also advise its use around drive-ways and garages, to minimize the amount of snow-shoveling required.

●

STEM AND SERIAL NUMBER

● Here is a little "shop hint" sent in by W. V. Merrill, Fleet Superintendent of Hoague-Sprague Corporation, Lynn, Mass., that ought to save lots of time in two ways:

Brother Merrill suggests that whenever you assemble a tire and tube, always stick the tube in so that it is right adjacent to the serial number of the casing.

The idea here is that if you ever have to find the serial number quickly, you just look for the tire valve, and there it is! . . . . Also, when fixing flats, and when looking for the nail in the casing, it will be unnecessary to mark the tire where the valve-stem was—since you will automatically know. To quote Brother Merrill:

"We have found that if we follow the practice of always having the valve stem of the inner tube right at the serial number, when mounting the tire, this will save many headaches and many hours of time."

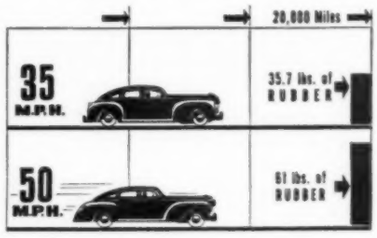
The only objection to this might come from those who feel that the valve stem ought to go where the red dot indicates, on the casing (if you can find the dot), in order to get a more perfect balance. The red dot is usually placed on new tires, at the "lightest" point of the tire, you know.

"Well, I'm ready! Didn't you say we were going to learn to do cold-welding today?"

●

WHAT ABOUT 35 m.p.h.—?

● Much has been said and written about how slow driving will make tires last longer, but little has been offered in the way of actual test data with *synthetic* tires.



The accompanying chart has recently been issued as a result of recent tests made with *synthetic* tires, which indicated that the amount of synthetic rubber used up in driving a car 20,000 miles at 35 m.p.h. is 35.7 pounds.

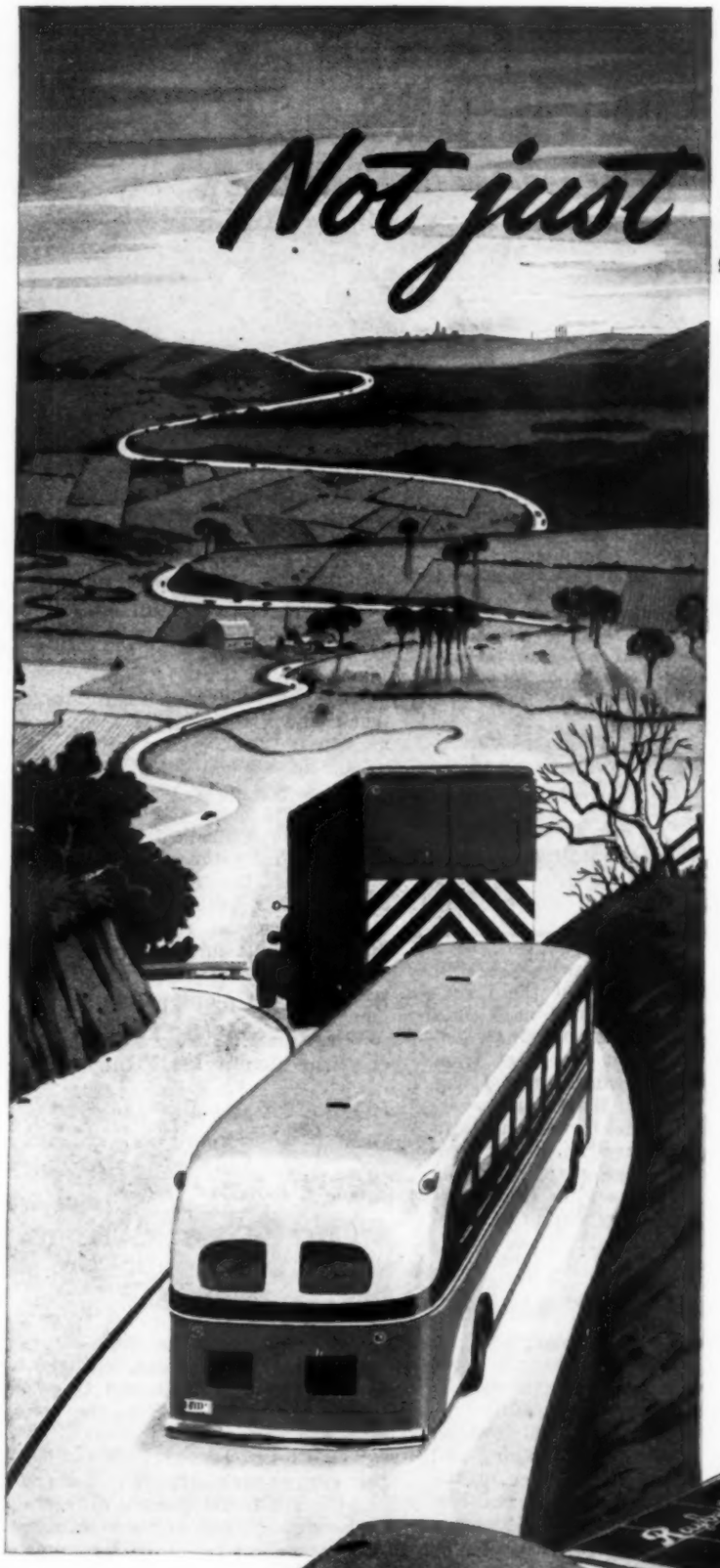
The lower half of the chart shows that 61 pounds of synthetic rubber will be used up while driving the car the same number of miles at the rate of 50 m.p.h.

Now that most of us are, or will soon be riding on synthetics all around, we now have some idea of the life expectancy of our tires and can base our speed accordingly—but don't let the speed-cop catch you, should you be affluently inclined!

●

DRAIN WHILE WARM

● When the crankcase of an engine is drained, it should be after the engine is warmed to normal operating temperature. . . . Cold oil does not flow readily, and so impurities are less likely to be removed by the draining. . . . You knew this all the time; didn't you?



Not just brakes, but DRIVING CONTROL

● Raybestos linings and brake blocks are more than just "stoppers." They give you full driving control . . . easy deceleration for sharp turns, steep hills, heavy traffic.

And when you consider that 6 out of every 7 brake applications on an average are for *slow-downs,* not stops, you can see why you're safest with Raybestos.

For *full-range* brake control at all times, reline with Raybestos . . . PG Truck Sets, drilled and countersunk for light and medium trucks—Heavy Duty Blocks for buses and bigger trucks.

THE RAYBESTOS DIVISION of Raybestos-Manhattan, Inc.
Bridgeport, Connecticut

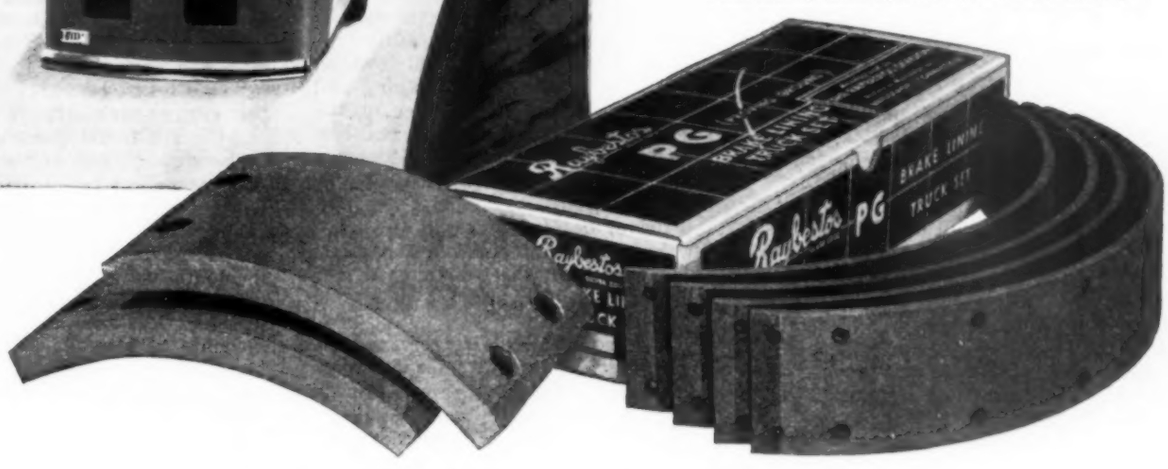
RELINE WITH

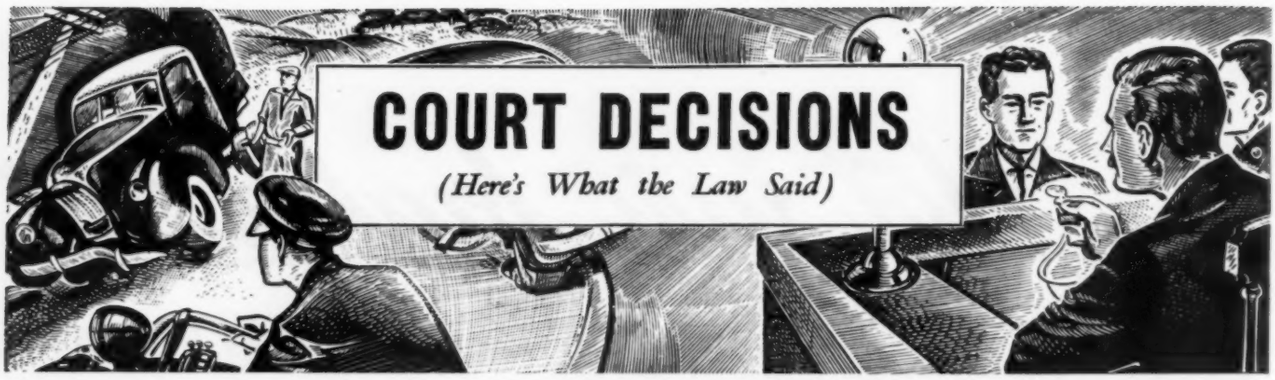
Raybestos

AMERICA'S BIGGEST SELLING

BRAKE LINING

BRAKE LINING • BRAKE BLOCKS • CLUTCH FACINGS
FAN BELTS • HOSE
FOR CARS, TRUCK, BUSES, AND TRACTORS





COURT DECISIONS

(Here's What the Law Said)

THERE are many legal principles which no fleet owner can afford to ignore, and these rules *can* be explained in simple language, without resorting to the jargon of the courts. This department will undertake to explain such general points of the law, without using any legal terminology. Each item is based upon an actual decision handed down in an American court, but all names are fictitious.

•

By Rotor Swift

Truck "Salesman" Was Liable

"I'D buy that truck if I had one more driver," the manager of the Elco Bakery suggested. . . . "Have you a good bright boy who could learn to drive?" the truck salesman queried. . . . "Yes, but the other drivers are all too busy to teach him."

"That's easy," the salesman proposed. "You buy the truck, I'll send one of my drivers who'll take the truck over your delivery route for 10 days. Your boy can go with him and tell him where to go. My man will take full charge of the driving and teach your boy at the same time." . . . "You've sold a truck," the manager agreed.

A few days later the bakery boy told the salesman's driver to go down a certain street, and just as the driver turned the corner, he struck and injured John Doe. . . . The day he left the hospital, Doe ordered his lawyer to demand damages from both parties.

"The bakery had bought and paid for the truck, their employee was in it and told the driver where to go," the salesman pointed out. . . . "The salesman's driver was at the wheel and had full control of the truck," the manager retorted.

"I'll sue the salesman," Doe's lawyer decided; and the Massachusetts Supreme Court decided that the salesman was the proper party to sue.

•

Insurance Policy No "Defense"

MODERN Truck Lines had left one of their trucks in a garage for repairs and the garage owner went

on a spree and burned up the garage and the entire contents thereof.

"You've got a chain of garages in the state that you haven't burned up, and you're perfectly good for the value of the truck," Mr. Modern remarked. . . . "All of your trucks are insured against fire, and the insurance company is an easier mark than I am," replied the garage owner. . . . "But, I don't intend to collect from the insurance company, when I can from you," was Mr. Modern's answer.

And the truck lines owner was quite right, as many American courts have ruled that a garage man, sued for negligence, cannot set up the insurance on the vehicle by way of defense.

•

The "Disregarded" Signal

THE Alabama driver overtook another truck, decided that he could travel faster, blew his horn, and the truck ahead pulled to the right.

Now, although the signal was as loud as the ordinary "overtaking and passing" warning, the driver of the truck ahead did not hear it, and had pulled to the right in order to enter a road to the left. . . . The rest can be easily imagined. . . . The overtaking driver decided that the other fellow was obeying the signal and started to pass him; the overtaken driver pulled to the left, and the inevitable collision occurred.

Then the overtaken driver sued the overtaker, and the Alabama Supreme Court ruled that he had no case, on the ground that the overtaker was justified in believing that the other fellow had heard the signal and was yielding the right-of-way.

•

The "Transmitted" Number

THE large black sedan plunged into the side of a truck belonging to the Elco Fleet and careened off, rapidly disappearing out of sight, down one of the many good highways in New Jersey.

"See that car which ran into the truck and then beat it away! Its number is 12345," yelled a little street urchin to his pal across the street. . . . A heavy-footed policeman pounding his beat down the street, having scented the collision from afar, was approached by the second boy, who volunteered the information: "The car's number is 12345."

The policeman rushed to a call-box, telling his chief: "Car No. 12345 just collided with one of the Elco trucks." And that's all for the moment.

When the Elco Fleet sued the owner of car number 12345, the two boys,

the policeman and the desk sergeant were called as witnesses, with the information that was passed from one boy to the other, then to the policeman and then to the sergeant.

"That's just hearsay! We object!" the car owner's attorney demurred. . . . But the Court thought differently, declaring: "Each of these witnesses was competent to verify the number, not to prove ownership of the car, but to present the complete concatentation of circumstances arising out of an incidental fact, and to show that in transmission, the fact transmitted was identical from its inception to its ultimate delivery at police headquarters". . . . That was the ponderous language in which the New Jersey courts ruled that the evidence was admissible, in a recent case.

"THAR'S GOLD IN THEM THAR HILLS"
for the P. I. E. FLEET OF FRUEHAUFS!
. . . 149 FRUEHAUF TRAILERS WORK FOR PACIFIC INTERMOUNTAIN EXPRESS

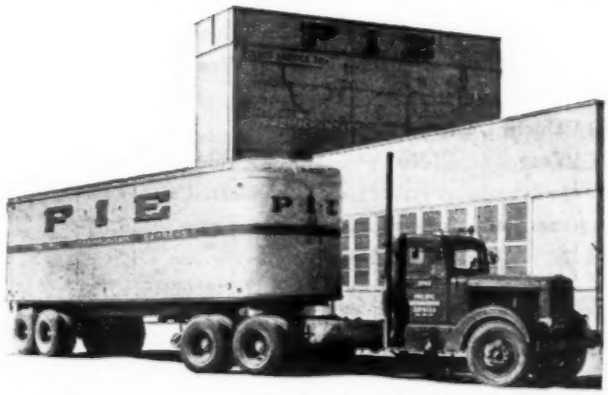
A Company Is Known by the Customers It KEEPS!

OVER STEEP mountain grades . . . across sweltering deserts . . . through busy city streets, the Fruehaufs in this Western fleet lick height, heat and hurry—helped the company build up a business from $85,000 to almost $500,000 monthly in just four years.

Pacific Intermountain Express began their operation in 1940. Their business zoomed to the second largest truck line operating as a common carrier west of Chicago. Today, they transport approximately 1,000,000 pounds of freight daily.

The home office is in Salt Lake City. Their fleet provides direct service to Chicago, St. Louis, Kansas City, Wichita, Denver, and the Pacific Coast. Other principal terminals are located in San Francisco, Los Angeles, Oakland, Sacramento, Reno, Ogden, and Pocatello.

C. Eugene Johnson, Vice-President and General Manager of Pacific Intermountain Express, points to some of the routes served by their Fruehaufs.



Big Fruehauf Freight Vans and diesel-power tractors that meet P.I.E. exacting freight schedules in all kinds of weather.

149 Fruehauf Trailers are pulled by 95 heavy-duty diesel tractors. The equipment has been the main factor in building this line over gruelling routes. So satisfactory has it proved that P. I. E. has now on order an additional 75 Fruehauf Trailers.

This is another striking example of how companies like P. I. E., the professional haulers of America, who depend upon their rolling equipment for their entire earnings, buy Fruehaufs again and again.

☆ ☆ ☆

World's Largest Builders of Truck-Trailers

FRUEHAUF TRAILER CO., DETROIT 32

Service in Principal Cities

A TRUCK IS LIKE A HORSE — IT CAN PULL MORE THAN IT CAN CARRY

"ENGINEERED TRANSPORTATION"

REG. U. S. PAT. OFF.

FRUEHAUF TRAILERS

GET THE "STORY" on HEATERS for TRUCKS

HERE, indeed, is a *controversial* question. . . . What about heaters in truck cabs? . . . What do other fleet operators think about the desirability of keeping the *driver* warm? . . . Should heaters be used in certain truck bodies to keep the *cargo* from freezing? . . . What *kind* of heaters are best? . . . What about the *new* types of heaters that the Air Force used to heat plane interiors? . . . Can trucks use this type?

Here is your opportunity to get the *best* possible answers to these and similar questions—by comparing notes with *hundreds* of other fleets. . . . The questionnaire below is brief. A few check-marks and a "Yes" here, a "No" there, are all *you* need to do. . . . We do the rest, and you get a *confidential* summary of all of the answers received. . . . See what others are doing, in this easy, convenient way. . . . Thanks.—*Editor.*

(Please tear out and mail to The Editor, Fleet Owner, 90 West St., New York 6, N. Y.)

Question No. 163—Heaters for Trucks & Buses

Do you use heaters in truck cabs?..... In passenger-cars?..... In buses?.....

If so, what *percentage* of your vehicles is equipped with heaters? *(Rough figure will do; indicate below)*

% of your trucks with heaters?.....% % of cars with heaters?.....% % of buses?.....%

What *type or types* of heaters are you NOW using? ☐ Hot-Water; ☐ Steam; ☐ Gasoline; ☐ Exhaust

Which *one* of the above types do you *prefer?* *(Please mention ONE only)*.....

Reasons for your preference, please.....

In your business, do you feel that there is a need for a heater to keep the *cargo* warm? ☐ Yes; ☐ No.

If so, what *average* temperature would you like to maintain in the truck or trailer body?.....*(Degrees F.)*

What difficulties have you had with heaters in the past? *(Please check your principal troubles below)*

☐ Cores Leak; ☐ Poor Electrical Connections; ☐ Don't Give Enough Heat
☐ Cores Clog; ☐ Poor Hose Connections; ☐ Exhaust Fumes Enter Cab
☐ Fans Fail; ☐ Mounting Device too Frail; Other troubles? .....
☐ Tubing Leaks; ☐ Shake Loose from Vibration; .....

When available, are you planning to equip your fleet with heaters? ☐ Cars; ☐ Trucks; ☐ Buses; ☐ All

On post-war heaters would you like to see a built-in defroster attachment for windshield? ☐ Yes; ☐ No.

What type heater would you like for equipment and replacements? ☐ Hot-Water; ☐ Gasoline; Others?.....

What is your source of supply on heaters? ☐ Jobber; ☐ Vehicle Dealer; Others?.....

Do you specify the *make* of heater desired when purchasing? ☐ Yes; ☐ No; ☐ As a rule.

What *make* (or makes) of heaters do you prefer?.....*(Confidential, of course)*

REMARKS: *(Anything is in order here; brickbats or bouquets, pet peeves, etc.)*.....

.....

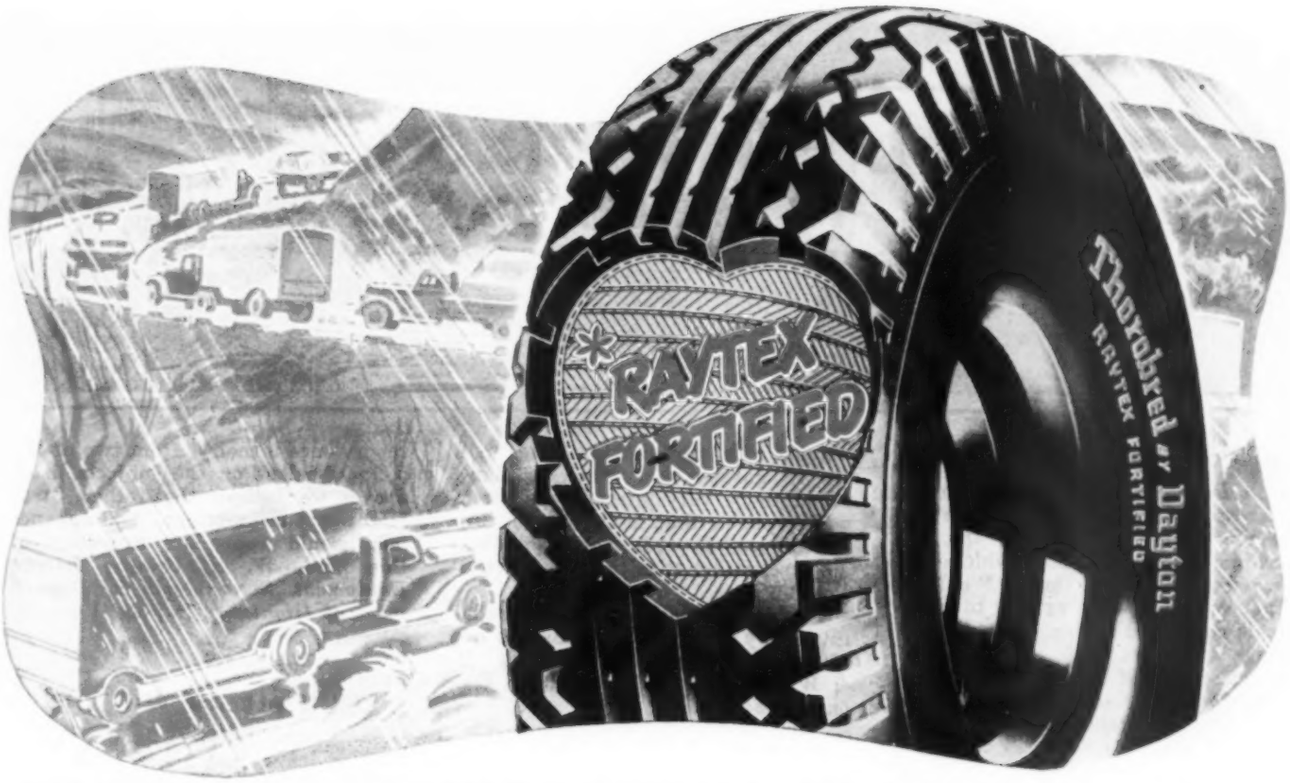
.....

How many vehicles in your fleet? *(Please indicate below)*

Trucks..... Tractors..... Trailers..... Pass. Cars..... Buses..... Misc.....

Mail THIS COUPON FOR FREE SURVEY

Name of Firm.....
Address .....
City and State.....
Your Name ..... *Position*.....



DAYTON CHALLENGES YOUR TOUGHEST HAUL···

···YOUR OWN RECORDS will be the judge!

Here's any girl, in charge of a fleet owner's truck tire records. She knows nothing about tread design, carcass construction, or bead composition. However, she does know which manufacturer's tires are producing the greatest on-the-job mileage in relation to their cost. And this, in the final analysis, is all *you* want to know.

Tire cost-per-mile, *from your own records,* is the only real low-down on truck tire performance. Claims for truck tire superiority mean little, unless they show up in the cost-per-mile column as the most consistently trouble-free performers . . . at the lowest cost-per-mile.

In fleets where complete records on truck tire performance are kept, Thorobreds by Dayton, show the most consistent record of staying on the job, for the toughest hauls . . . at the lowest cost-per-mile.

Put a pair of the new Thorobreds by Dayton on the toughest haul on your schedule and we will rest our case . . . more miles for less dollars . . . *on your own cost records.* If you aren't keeping mileage records of your tire performance and need help to set them up, call your nearest Dealer in Tires by Dayton and he will be glad to help you, or write to Dayton Rubber Mfg. Company, Dayton 1, Ohio.

* The Fighting Heart of each Dayton Thorobred is now reinforced with NEW 2200 Denier Rayon Cords. Super-strong, heat-resisting *Raytex cords welded by a special Dayton process "float in rubber" giving additional mileage . . . at the lowest cost-per-mile.

* Dayton Processed Rayon Cord

Dayton Rubber

THE MARK OF TECHNICAL EXCELLENCE IN NATURAL AND SYNTHETIC RUBBER

LIKED SAFETY ARTICLE

● *Dear Mr. Fischer:* Of timely interest to me was Mr. Neary's article on the safety activities of the Old Reading Brewery fleet, which appeared in a recent issue. We have sent copies of this article to principals concerned within our organization.

The advent of new equipment and new safety methods and systems calls for renewed attention and analysis. In other words, new ideas and suggestions on safety are now in order, and should be thoroughly analyzed in the light of past experiences. From such discussions and analyses can fleet operators implement more effective safety plans.

Should you have any additional articles or literature on how fleet operators can secure maximum driver cooperation to keep accidents down to a minimum, we will be glad to see them in FLEET OWNER.—*Eugene Kovacs, Cab Service & Parts Corporation, New York, N. Y.*

●

SUGGESTS CIRCUIT-BREAKERS

● *To the Editor:* In connection with your Question No. 159 on Fire Extinguishers, the fact that we have had several units destroyed by fire, gives us good reason to believe that there is one thing lacking on all heavy-duty units, and that is a circuit-breaker, as when there is a short circuit in the wiring, it appears as though no type of fire extinguisher is effective, unless the electrical circuit is broken first.

We have talked with a manufacturer of the vehicle equipment which we use predominantly, in this connection, regarding the use of a circuit-breaker for the various wiring circuits, which will automatically break the circuit in the event of either overload or a short.

From our own experience, we have found that more fires develop through short circuits in the electrical system than from any other single cause.

In this connection, we do have a number of carbon dioxide extinguishers in garage use, which we have found to be very effective, and it is very probable that in the near future we will lean towards the carbon dioxide type, rather than the carbon tetrachloride type.

Our experience has also shown that invariably the fire extinguishers are of insufficient size.—*V. J. Grice, H. & W. Motor Express Company, Dubuque, Iowa.*

●

BACK FROM OVERSEAS

● *Dear Mr. Fischer:* After forty months of service in the Armed Forces, the writer is back with his fleet again.

I would like to thank you for being so considerate and conscientious in sending me FLEET OWNER all of the time that I was in the Service. It meant a great deal to me to have it to fill in my spare hours, and I feel that it helped me greatly to keep quite closely in touch with developments in the automotive field back home.—*L. S. MacRobbie, General Manager, Oak Park Nurseries, East Patchogue, L. I., N. Y.*

●

WOULD EXCHANGE DATA

● *To the Editor:* I have a pet idea that I would like to hear from some of the other State Highway Departments, as we of the highway departments must all, undoubtedly, have certain problems in common.

Typical subjects on which data could be exchanged include the following: How machinery is purchased; the results obtained from various types; the set-up as to shops; the salaries paid to mechanics; the mechanical short-cuts that they might have developed; and the responsibility of equipment operators. Also, the complete maintenance program might be cooperatively discussed, so far as equipment is concerned.

We don't expect FLEET OWNER to set up a special Highway Department Section, but if we could get a report once a month from two of the main divisions on the subjects listed above, we believe that other State Highway Department maintenance men would appreciate a service of this kind.—*W. H. Brown, District Equipment Superintendent, Department of Highways, Suffolk, Va.*

●

"READ IT ALL THE WAY THRU"

● *To the Editor:* Just a line to let you know that I get much good out of your magazine, FLEET OWNER, and read it all the way through. . . . I am very grateful to you, indeed, for your courtesy in sending it each month.—*H. J. Hamann, Supt. Maintenance, Marathon County Highway Department, Wausau, Wis.*

●

MORE BOUQUETS

● Editor Fischer notes with interest and appreciation the following brief remarks, penned-in on various correspondence coming into his office. This means is being taken of acknowledging same:

● "Just a line to let you know that we think your monthly publication FLEET OWNER is great! We would insist on getting it, even if we had to pay for it."—*O. E. Bickford, Owner & Manager, Yellow Cab Company, Fitchburg, Mass.*

● "Thanks for past papers. On many times I have found them to be quite a lot of help."—*J. W. Birch, c/o Southwestern Greyhound Lines, Inc., N. Kansas City, Mo.*

●

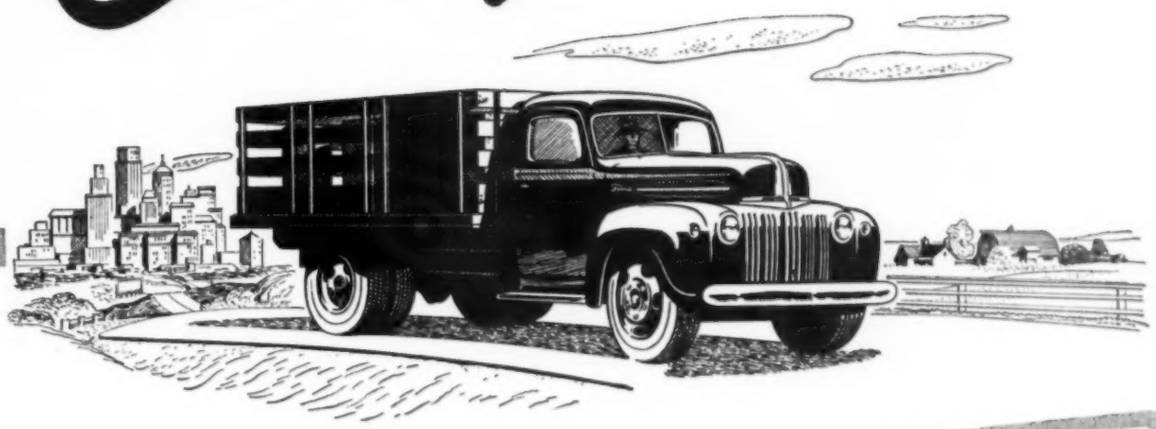
LONGER WAY IS BETTER?

● Sometimes it is better to drive the longest way. . . . Ten miles of driving on dirt or loose gravel is likely to wear automobile tires more and take more gasoline, than 15 miles of driving on good, hard-surfaced roads.

WRITE A LETTER TO THE EDITOR — GET IT OFF YOUR CHEST!

Ford

FORD TRUCKS *Everywhere!*



- 32 IMPORTANT New ENGINEERING ADVANCEMENTS
- 51 BODY AND CHASSIS COMBINATIONS
- TWO GREAT FORD ENGINES— THE 100 H.P. V-8 and the 90 H.P. SIX

because of

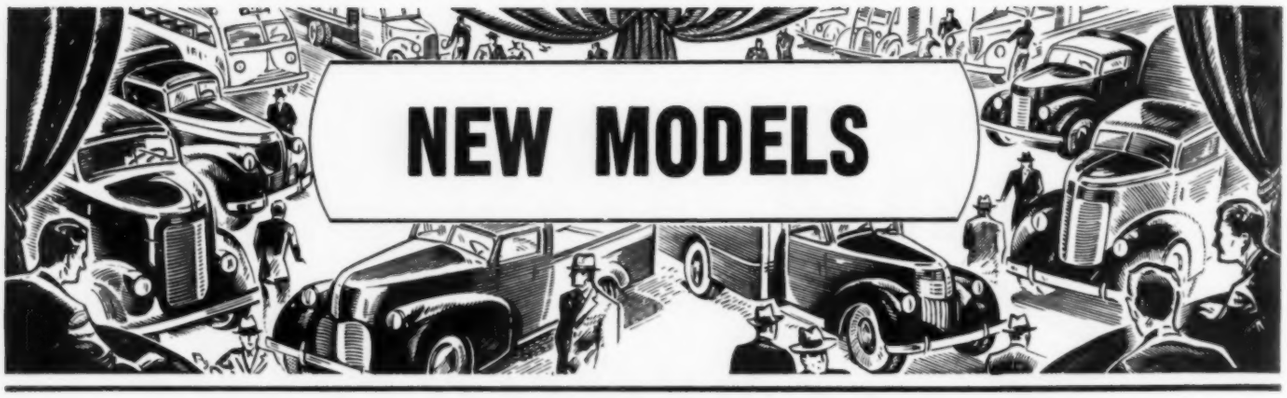
LOW INITIAL COST

LOW OPERATING COST

LOW MAINTENANCE COST

Availability of Service and Parts— Everywhere, Quickly

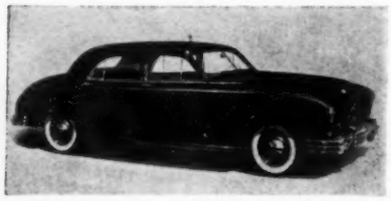
SEE YOUR FRIENDLY FORD DEALER



NEW MODELS

New Frazer Car is Announced

THE new, medium-priced Frazer car, named after the Graham-Paige president, Jos. W. Frazer, was revealed to the public last month. It



was described as a "full-sized, 6-passenger car, designed by Howard A. Darrin, well-known automobile stylist, on a wheelbase of 123½ inches."

The new car is powered with a 6-cylinder, 100 h.p. engine, designed by Continental and Graham-Paige engineers. It features independent front-wheel suspension, forced-draft ventilation, low over-all height and an extremely roomy body.

The body of the new Frazer utilizes the full width of the car, the fenders becoming an integrated part of the body. The width of the rear seat is such that four persons can be accommodated, it is pointed out. The rear seat is located forward of the rear axle, to provide a better ride. The conventional drive-shaft tunnel has been eliminated. Vision is very liberal as the pillar posts are set back to provide greater front and side visibility. A large, contoured rear window adds to the visibility.

The interior is well styled, with appointments of chrome, plastics and lucite. The outside door handles are firmly attached at both ends, and are operated by "trigger-action" when compressed with the fingers. Inside door controls are recessed and concealed, being of the push-button type.

Other data released to-date includes: The use of exceptionally large wide-base rims, for better tire stability and performance; independent front-wheel suspension; over-all height of 64½ inches; instrument panel of unusual design and a claim of excellent fuel economy.

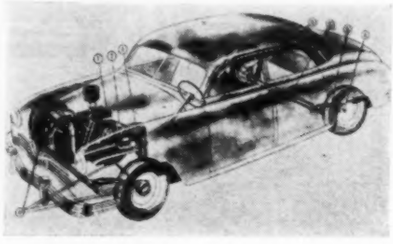
•

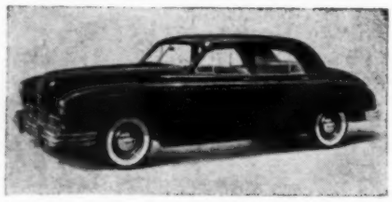
Novel Features in Kaiser Car

NAMED after Henry J. Kaiser, wartime ship production expert, the new Kaiser automobile, a product of the Kaiser-Frazer Corporation, was announced in some detail last month. The appearance of the new car is very similar to the new Frazer, also illustrated on this page, but its mechanical features are quite unconventional.

As shown in the accompanying phantom view, front-wheel-drive is featured and the type of suspension is new for passenger-cars. Mounted on a 117-inch wheelbase chassis, the new Kaiser car is said to have a full-sized body, even though it is described as a "light-weight" automobile, built to carry six passengers.

The six-cylinder, 85 h.p. engine, together with the clutch, transmission and final drive assembly, form a single "packaged-power" unit mounted forward in such a manner





that it is possible for the complete unit (engine, transmission and driving axle) to be lifted clear for ease of servicing, exchange, etc.

The engine is placed forward of the driving axle, which is said to maintain a more constant center of gravity and result in better traction on hills and under other bad driving conditions.

The suspension is described as being of the "torsionetic" type, which gets its springing action from the twisting of long, heat-treated steel bars, controlled by hydraulic shock-absorbers. This is said to give a smooth ride regardless of passenger load.

The body and chassis of the new car are built on the single-unit or "monocoque" principle, which includes both as one integral unit. The engine was developed by Continental and Graham-Paige engineers, and is said to be new. As this is being written, more complete details of the "packaged-power" unit were not available. It will be interesting to learn how the final drive, from power axle to wheels, is obtained.

The captions for the accompanying photograph (if you can read the numbers) are as follows: (1) engine; (2) clutch; (3) transmission; (4) final drive assembly; this comprises the "packaged-power" unit. The new "torsionetic" suspension provides independent springing for each wheel through spindle (a); supporting arm (b); and torsion-bar spring (c); anchored at (d).

Other features pointed out by the maker include: New type, trigger-action outside door handles; concealed, push-button inside door controls; wide-base wheel rims; pressure-chamber ventilating system; chrome, plastic and lucite interior knobs and escutcheons; new-type, self-centering, four-wheels brakes; large rear window contoured to the body curves; two-tone broadcloth upholstery; large luggage compartment; recessed license-plate space; and concealed hinges on all doors.

•

Packard Offers New Taxicab

THE Packard Motor Car Company unveiled its new 1946 model taxicab at a special showing in New York City last month. It is called the "Clipper" taxicab and features "a clear plastic hood that shrouds the driver like a fighter-plane's canopy"; also what is described as a revolutionary type of forward-facing seat for two extra passengers. Production

is estimated to be under way early this spring.

The new type front seat is actually wider than the ordinary bus seat and accommodates two passengers. It is hinged on the center pillar and is latched at the driver's (plastic) partition. The seat cushion also folds, to provide extra luggage space when needed. Passengers step into it through the right front door. If left-loading is desirable, as on one-way

(*Please turn to page* 146)

One Sure Road to LOWER OPERATING COSTS...

The Firestone 3 POINT PROGRAM

1 **Prevent tire trouble** before it starts with the new Firestone *Certified* Plus Mileage Plan. We will inspect your tires regularly and offer specific recommendations on how you can get greater tire mileage.

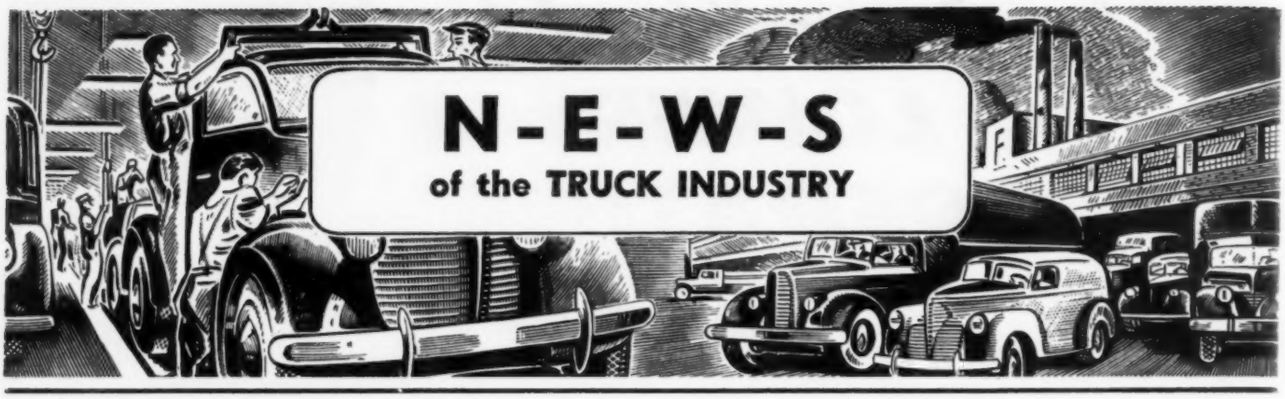
2 **Recap smooth tires** with the Firestone Factory method. Factory-trained men, using the finest material and equipment available, will give your worn tires thousands of miles of extra life.

3 **Buy the best,** the Firestone Transport, when you need new truck tires. Because it is a better built tire, the Firestone Transport will go further, last longer, wear better and cost you less.

We at Firestone, are building the best truck tire manufactured today. Painstaking research, the finest craftsmanship, the highest quality materials, and the most modern, improved manufacturing processes go into the building of this tire. Put Firestone Transports on your trucks and your records will prove that they lower your operating costs.

Firestone
TRANSPORT TRUCK TIRES

Listen to the Voice of Firestone every Monday evening over NBC.



Dodge Resumes Training Salesmen

THE national program of training retail truck salesmen, in effect before the war, is being resumed by Dodge Truck Division, according to L. F. Van Nortwick, director of truck sales. . . . The training program will be conducted in the various Dodge regions and made available to all Dodge dealers and salesmen, who will be trained to study truck users' needs and recommend proper equipment for maximum performance, durability and economy of operation.

•

Ford's Advertising Division Expanded

ADDITIONS and personnel changes in the Ford Motor Company's expanded advertising division were announced recently by J. R. Davis, director of sales and advertising. . . . Ben R. Donaldson has been appointed assistant director of advertising; Frank J. McGinnis has been selected to head up Ford passenger-car advertising; Walter E. Blanchard will assist Mr. Donaldson; John S. Lueck has joined the Lincoln-Mercury Advertising division; and Rudy Speerschneider now is handling displays and special exhibits for the Ford Motor Company.

•

Heads Mack's Central Bus Division

MACK announces the appointment of John J. Byrne as bus sales manager of its Central Division territory; he recently had been in charge of national account sales for the same territory. . . . Mr. Byrne has been with Mack for more than 20 years and has managed several branches. He will make his headquarters in Chicago. . . . R. W. Snowberger, bus manager for the southwestern district, with offices in Dallas, and R. T. Strouse, bus manager for the northwestern district, with offices in St. Paul, will both work directly under Mr. Byrne.

•

Jensen Named Parts Service Mgr.

THE White Motor Company announces the appointment of Clifford P. Jensen as parts service manager, with headquarters at the home office in Cleveland. . . . He brings to his new position lots of automotive experience, having been with Standard Oil Company of New York and Chevrolet Division of General Motors for several years.

Kelly Named Regional Bus Mgr.

MAJOR William T. Kelly, who has returned to civilian life, following more than three years of military service, has been appointed regional bus manager of the White Motor Company, covering the Northeastern region, according to an announcement by Ira S. Snead, vice-president in charge of the Bus Division. . . . Headquarters will be maintained at the Boston Branch of White Motor, at 930 Commonwealth Avenue. . . . Mr. Kelly has had 20 years of experience in the automotive field and is well versed in the sale and service of motor trucks and buses.

•

Davies Back as Heil Dist. Mgr.

BACK into "civies" after two years as a Captain in Army Ordnance, Jack Davies has been appointed district manager for sales of all Heil products in the Southeastern states of Tennessee, Alabama, Georgia, the Carolinas and Florida. . . . Headquarters for this district are in the Commercial Bank Building, Raleigh, N. C. . . . Ray Long, who has been representing the company in this territory, will continue to work out of the Raleigh office but will concentrate on road machinery sales.

•

Buckendale Heads Engineering Board

THE appointment of L. R. Buckendale, vice-president in charge of engineering for Timken-Detroit Axle Company, as Chairman of the SAE Technical Board, was recently announced. . . . Mr. Buckendale has long been a leader in the automotive engineering field and a diligent worker for the SAE. . . . He has been with Timken-Detroit Axle Company since 1911.

MACK resumes bus production. . . . Here you see the first of the new, 41-passenger transit-type Mack buses to come off the assembly-line at Allentown, Pa. . . . About ten per day will soon be the minimum.

Sloan Returns to Federal Truck

THE appointment of Earl L. Sloan, as regional manager, has recently been announced by the Federal Motor Truck Company, Detroit, Mich. . . . Mr. Sloan will direct factory sales for the Kansas City and St. Louis regions. . . . He has a background of 24 years' experience in truck merchandising and returns to a position similar to that he held with Federal during 1937-38, when he was district manager for the company's Minneapolis region.

•

Hufstader Joins Studebaker Staff

STUDEBAKER announces that Orton P. Hufstader, who during the war held several key spots with OPA in Washington and New York on truck tire conservation and auto rationing, has been named regional truck supervisor for its Philadelphia and Pittsburgh territories. . . . Mr. Hufstader joins Studebaker with 12 years' experience in the automobile business. . . . A one-time factory field man, he also operated a successful auto dealership before the war.

•

Andrews Return to Trailmobile

IT has been announced that William N. Andrews returned recently to the Trailmobile Company as director of public relations, after he had been released from the United States Naval Reserve. . . . Before enlisting in the Navy, Mr. Andrews was factory personnel manager of Trailmobile.

•

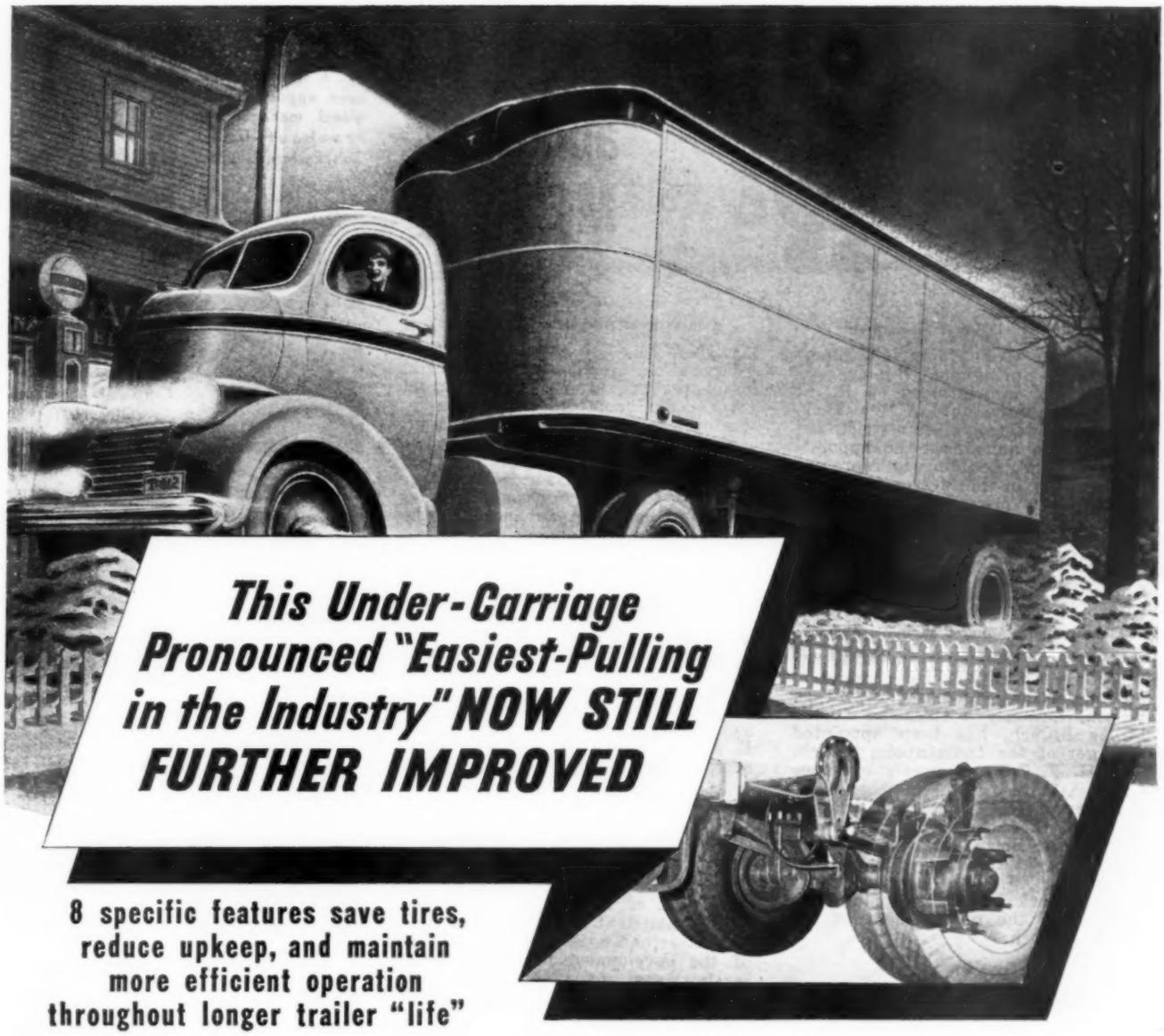
Sellers Joins Ford Exec. Sales Staff

DEAN L. SELLERS has recently been added to the executive sales staff of the Ford Motor Company. . . . Prior to his affiliation at Ford, he directed domestic tractor sales operations of Harry Ferguson, Inc. . . . He will make his headquarters at Dearborn, Mich.

•

Johnson Heads N. E. Bus Division

MACK announces the appointment of Arthur Johnson as bus sales manager for its New England Division. . . . Mr. Johnson has been with the Mack organization since 1924. . . . As head of the Division's bus sales, he will make his office at Mack's divisional headquarters, 75 N. Beacon St., Boston, Mass.



This Under-Carriage Pronounced "Easiest-Pulling in the Industry" NOW STILL FURTHER IMPROVED

8 specific features save tires, reduce upkeep, and maintain more efficient operation throughout longer trailer "life"

The under-carriage voted first choice by the industry is now made even better!

Its tubular axles with special alloy tapered spindles resist deflection from *all* directions, instead of from merely overhead, eliminating nearly *all* of the usual axle troubles.

Its bearings have been made to serve far more efficiently; to operate at their *full* rated capacity, and for much longer service, through their *correct* positioning—by Trailmobile's exclusive ELECTRONIC stress-determinations!

Holes in the spring seats for over-sized spring clips, and bigger "unitary" nuts *hold* Trailmobile springs in *accurate* position. With hangers directly under the frame, *most* spring-difficulties are avoided. And the 3½-inch, wider Trailmobile spring-leaves saves 14% of the leaves, operate springs much more efficiently. Together, these modifications deliver 25% additional strength against under-carriage side-play.

Trailmobile's *properly* rubber-bushed radius-rods, under load, are *truly* horizontal; hence *actually* save tires, due to *stable* axle-alignment.

For positive braking a Trailmobile axle accommodates either air or vacuum diaphragms. And they are so designed as to permit *maximum* leverages for *full* braking power.

All in all, Trailmobile's *standard* under-carriage remains without parallel. See it, at your near-by Trailmobile Branch. And, if you *haven't* as yet seen Trailmobile's new Tandem, it, in itself, is worth your visit, soon!

•

THE TRAILMOBILE COMPANY
Cincinnati 9, Ohio

TRAILMOBILE

Protecting its 104 Year Reputation

—71 "Homefolks" Service Centers

© 1946 The Trailmobile Co.

MOSTLY about MEN

Weaver Makes New Appointments

WEAVER Manufacturing Company, Springfield, Illinois, announces the appointment of R. F. Lane to cover the state of New York, exclusive of Metropolitan district. . . . Weaver also announces the appointment of C. F. Leubling to represent the company in the Metropolitan district of New York, and A. G. Wood to represent the company in Metropolitan Chicago and the Eastern section of Northern Illinois.

•

Changes in Wagner Branch Personnel

WAGNER Electric Corporation announces the following changes in automotive branch personnel: F. G. Wilson, formerly a salesman at the Dallas branch, has been appointed manager of the Indianapolis branch. . . . H. F. Zahn, formerly manager of the Atlanta branch, has been made manager of the Philadelphia branch. . . . . C. G. Jackson, formerly manager of the Boston branch, has been moved to Atlanta to manage that branch. . . . J. K. Miller, heretofore a New York branch salesman, has taken over the management of the Boston branch.

•

Hickman New Bendix Field Man

AS a part of the company's expansion program, M. E. Hickman joins the Bendix Products Division sales staff, according to T. A. Kreuser, service sales manager. . . . Mr. Hickman has been with Bendix for the past two years and transfers to the service sales department. . . . He will make his headquarters at the divisional home office, South Bend, Ind.

•

K-D Lamp Co. Promotes Bissonette

THE K-D Lamp Company, Cincinnati, Ohio, announces that C. A. Bissonette, who has been with them for the past 15 years, has recently been appointed assistant to the sales manager of that company.

•

E. O. Jones Re-Joins Ethyl Corp.

AFTER two years with the PAW, E. O. Jones has re-joined the Ethyl Corporation, and will be a staff assistant to Julian J. Frey, general sales manager, it was recently announced. . . . Mr. Jones had been with Ethyl for 12 years, when he joined PAW in 1943 as petroleum engineer. He was later appointed assistant director of refining.

Hein-Werner Announces Promotions

HEIN-WERNER Motor Parts Corporation, Waukesha, Wisconsin, announces the promotion of Harold C. Norman from sales manager to vice-president and general manager. He has also been elected a member of the board of directors. . . . Robert J. Raht, who has been service manager and more recently assistant sales manager, has been advanced to the position of sales manager.

•

Mike Way Promoted at Goodrich

THE B. F. Goodrich Company announces that M. J. "Mike" Way has been appointed sales manager of accessories and repair materials in the Associated Tire & Accessory Division of the Company. . . . He succeeds E. A. Schneider, who has resigned to accept another position.

•

Harrington Now Assistant Sales Mgr.

WIX Accessories Corporation, Gastonia, N. C., announces the appointment of Frank M. Harrington, Jr., as assistant sales manager. . . . Mr. Harrington is placed in charge of the development of sales in the territory east of the Mississippi River. He will handle the complete line of Wix Oil Filters and Filterefils. . . . Mr. Harrington has been connected with American Grease Stick Company, Muskegon, Michigan, for a number of years.

•

King Succeeds Donovan at Fiberglas

LUDLOW KING has been appointed manager of the Washington, D. C. office of Owens-Corning Fiberglas Corporation, Toledo, Ohio. . . . Mr. King recently retired from the Chemical Warfare Service in which he was commissioned a lieutenant Colonel. . . . He succeeds C. R. Donovan, who resigned recently to establish his own firm as a Washington business consultant.

•

Christian Now Eclipse Chief Engineer

THE appointment of F. T. Christian as chief engineer of the Eclipse Machine Division of Bendix Aviation Corporation was announced recently. . . . Mr. Christian has been associated with the Eclipse engineering staff since 1929. . . . Since 1940, he has directed engineering for the company's commercial production of Bendix starter drives and bicycle coaster brakes. He is a member of the Society of Automotive Engineers.

W. J. Robinson has been appointed regional manager of Fruehauf Trailer Co's. Eastern Region.

W. M. Walworth has been elected vice-president and chief engineer of Mack Manufacturing Corp., New York City, N. Y.

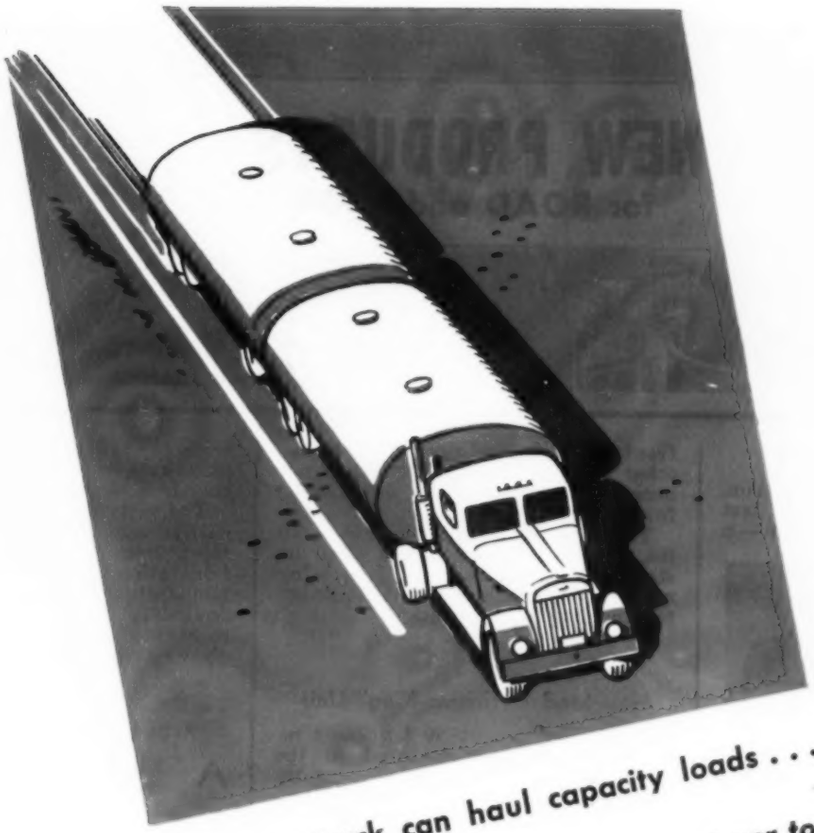
J. Milton Shatzel has been appointed works manager of The Federal Motor Truck Company, Detroit, Michigan.

Leo H. Burke has been appointed sales representative for The Armstrong Rubber Company in Michigan, Ohio, Indiana and Kentucky.

Fred E. Nolen, vice-pres. and gen. mgr. of Colyear Motor Sales Co., has been elected pres. of N.A.P.A.

Don Greene has been appointed assistant sales manager of the Replacement Sales Div. of Wilkening Mfg. Company.

Leo Spalding has been appointed general sales manager of the Brookins Mfg. Co., Div. of Balcrank Inc.

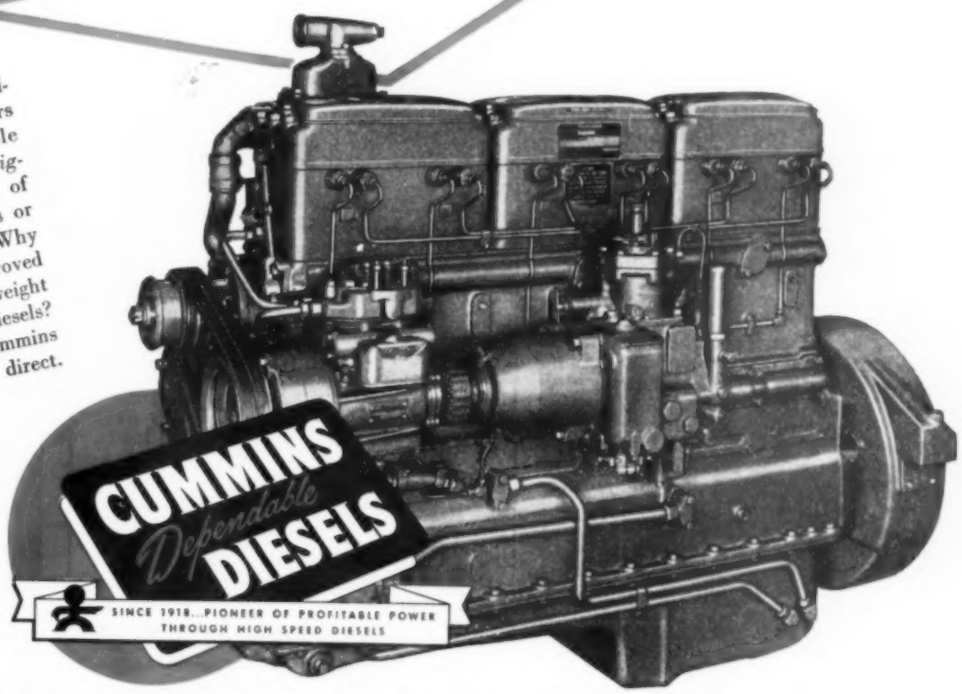


Your new truck can haul capacity loads . . .

on faster schedules . . . at a lower cost per ton

. . . with a Cummins Dependable Diesel!

PROOF! Today there are 24 leading truck manufacturers who offer Cummins Dependable Diesels as standard or optional *original power*. Here's ample proof of profitable power—for long hauls or short—over the highway or off! Why not get all the facts on the proved economy, reliability and low weight per horsepower of Cummins Diesels? 150-200-275 hp. See your Cummins Dealer, or write Cummins direct.

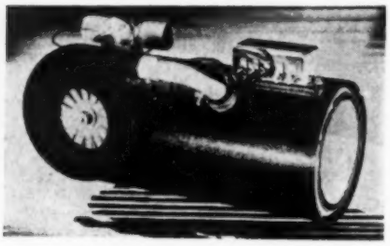


CUMMINS ENGINE COMPANY, INC., COLUMBUS, INDIANA

NEW PRODUCTS
for ROAD and SHOP

New "South Wind" Heater

THE Stewart-Warner Corporation, Chicago, Ill., announces its first post-war heater development — a



brand new version of the well-known "South Wind" heater, in the form of a deluxe model, illustrated here. It is suitable for cars, trucks or buses.

The new job produces quick heat output and also air-conditioning and humidity control. Features include: Rapid heating; introduction of a large volume of warmed fresh air; draftless distribution of heat; and a unique modulating flow temperature control that "anticipates" temperature changes and adjusts the heater operation to maintain a preselected temperature in the vehicle.

Its control of humidity is such that it prevents the frosting and fogging of windows, according to L. A. Williams, Jr., vice-president of Stewart-Warner. It pours a large volume of warmed air into the vehicle in less than a minute after it is turned on. It operates independently of the vehicle's engine.

This new model is a gasoline-burning heater with maximum heat output of 20,000 B.t.u. per hour. Mounted under the hood and equipped with a blower that draws in cold, fresh air from a point just behind the radiator grille, the heater warms and delivers to the ducting system sufficient air to provide a complete air change every 90 seconds or less, it is claimed.

The heater has no effect on engine performance, taking its fuel supply from the gasoline line between the fuel pump and the carburetor. There is no connection to the manifold or cooling system. A dual-duty thermostat does the regulating. Since the fan of the fresh air intake can be turned on without the heater operating, an additional ventilating function is thus performed.

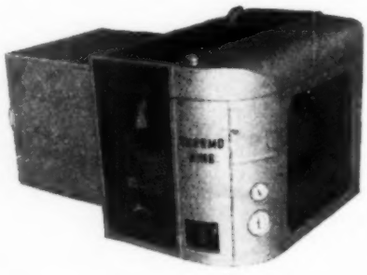
In a typical car installation, the warmed air is ducted from the heater to two outlets at the windshield and to outlets under each side of the front seat. In addition, there is another "foot-warmer" outlet. It is not necessary to disconnect this heater for summer operation.

The new heater weighs about 10 lbs. and will be available both as standard equipment as well as being marketed through the S-W distributor and dealer organization.

•

New Model "Thermo-King" Unit

LATE developments in transport refrigeration are featured in the Thermo-King Model D-10, recently announced by the U. S. Thermo Control Company, Minneapolis, Minn. A



new type of starter-generator, which becomes an integral part of the engine, heads the list of major improvements.

Model D-10 is larger in size and refrigeration capacity than previous Thermo-King units, and was designed to meet the demand for a heavy-duty machine for heavy refrigeration loads. In response to the U. S. Army's request for a light-weight refrigeration unit for installation in its new aluminum semi-trailers, U. S. Thermo Control developed the military version of the Model D-10.

With slight variations, the new model is the counterpart of the Army unit, and incorporates its construction features. Weight of the unit is 755 pounds. Operation is entirely automatic, once the desired temperature has been adjusted on the thermostatic control. Refrigeration is accomplished by forced convection. Air is drawn from the trailer body into the evaporator coil, the heat is extracted and the air is blown back into the body.

The new Thermo-King features an easily-installed kit for heating service. Heat from the engine and the refrigeration gas is utilized and the temperature is thermostatically-controlled. . . . The manufacturer expects to begin delivery of the model within sixty or ninety days.

•

Rubber "Rivet" for Tire Repair

A NEW product of the J. W. Speaker Corporation, Milwaukee 12, Wis., is the blowout-proof rubber rivet shown here, which permanently seals small breaks and nail or spike holes.

By "flowing" into every inside crevice and putting a rubber "head" outside the original injury, the blowout-proof rubber rivet prevents water and slush seepage, chief cause of fabric rot and eventual blowouts, according to the manufacturer.

The rubber rivet, made in three sizes, consists of a circular rubber base and a rubber stem, with a spiraled steel needle that goes through openings as small as pin holes. Rubber cement, applied to the rubber stem and the casing hole, serves as a lubricant. A quick, hard pull on a pliers thins out the rubber stem to the exact diameter of the hole and enables it to slip through. The rubber stem, released when the wire pulls off, shortens and spreads against the walls of the hole. When the protruding rubber is snipped off an eighth of an inch from the casing tread or sidewall, the effect is that of a rivet, with an apron base on the inside and a head on the outside.

Tires of automobiles, trucks, tractors, motorcycles, bicycles and small planes are protected against inside-rot blowouts with this device, which can be installed in two or three minutes, the maker states.

You'll Be Glad You Waited

FOR DU PONT

DULUX

REG. U. S. PAT. OFF.

the finish that lasts longer, cuts finishing time and costs

GOOD NEWS! Increased production of Du Pont DULUX promises a growing supply available to fleet operators. This outstanding finish has long been the standard in the refinish field. Why? Because tough DULUX stands up under severe weathering and rough handling. Because equipment finished in DULUX looks better longer, requires less "time out" in the paint shop. Put DULUX first on your finishes list and check with your supplier for availability.

E. I. du Pont de Nemours & Co. (Inc.), Finishes Division, Wilmington 98, Delaware.

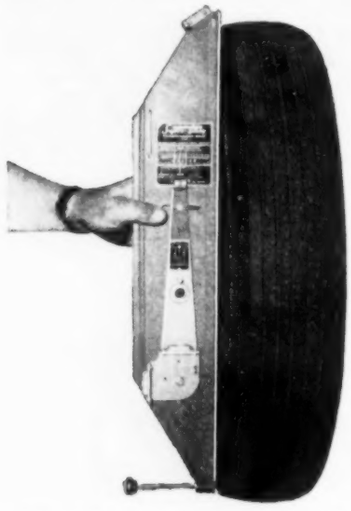
BACK AGAIN!

DU PONT
REG. U. S. PAT. OFF.
DULUX
REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

New Camber-Caster Gauge

A NEW type of camber-caster gauge, called the "Super-Easy," has recently been placed on the market by



the Micro-Linor Service Corporation, 1627 W. Fort St., Detroit 16, Mich.

A unique feature of the "Super-Easy" is a built-in floor slope compensator which simply and quickly determines the floor slope. Once the gauge is set to the floor slope, the slope is automatically compensated for in all readings.

The "Super-Easy" is said to be designed to meet the present-day needs of the over-burdened mechanic—an inexpensive device for making camber and caster tests quickly and accurately, doing the job in a fraction of the time formerly required. For example, it will check the floor slope and one wheel for camber in 30 seconds, according to the makers.

•

New Grey-Rock Catalog

CATALOG No. 645 has been shipped to distributors of Grey-Rock automotive products for their salesmen's use, by United States Asbestos Division of Raybestos-Manhattan, Inc., Manheim, Pa.

An innovation is a 20-page section printed in 3 colors and bound in the front of the book, which tells how Grey-Rock brake linings and clutch facings are made . . . gives highlights of Grey-Rock advertising and merchandising over the past decade . . . shows the many current saleshelps available . . . the product story . . . the many services Grey-Rock provides their distributors and dealers. It's a Wholesalers Salesman's Sales Portfolio.

The catalog contains the usual complete information on all types of Grey-Rock brake linings and clutch facings, with complete specifications and application data.

Also included in the back of the book is a 24-page section devoted to the development of the Grey-Rock Line of fan belts, radiator and other automotive hose . . . how they are made . . . advertised and merchandised. Specifications and application data are also included on these products in this section.

Grey-Rock also announces the preparation of a new Dealer Catalog which will be ready for distribution in the near future.

•

White Offers 1946 Calendar

THE White Motor Company recently announced its new complimentary calendar for 1946, illustrated here. This year's piece is highly colorful, using attractive art-work to paint the "picture" of trucks and buses in operation, paying tribute to the splendid service offered by the users.

The calendar measures 21 x 33 inches in size and presents two months in featured position, with the preceding and suceeding month below in smaller type. More than half of the page is devoted to art-work, while the bottom is given over to company signature, trade-mark and slogan.

The first page of the six-page piece tells a general story of all industries

using trucks and buses. This is followed by a page featuring the construction industry, one devoted to local and long-distance transportation, another given to local passenger service, a fifth picturing the petroleum industry, and finally one which pays tribute to the dairy industry and its essential service. Each page employs a varying color treatment that lends special interest, and the entire piece becomes highly desirable for use on office walls.

•

Develops New "Safety Rim"

NEW protection against hazards from blowouts or flat tires will be engineered into the new 1946 Plymouth, Dodge, De Soto and Chrysler cars, it was announced by Chrysler Corporation recently.

This will be accomplished through the use of safety rim wheels, which will be exclusive on all Chrysler-built cars, and is the first feature to be announced as incorporated on all of the Company's 1946 vehicles.

In the event of a sudden puncture or blowout when a tire may flatten out like a pancake, the safety-rim wheel so grips the tire that it is practically impossible for the tire to come off the rim or slip crosswise to the wheel, it is claimed.

The Chrysler safety-rim wheels were put to the most grueling tests. Dynamite caps were attached to car's tires, and exploded at 75 miles per hour, but these cars always were brought to safe stops under control, the engineers declared.

Fundamental engineering behind the safety-rim, strangely enough, is as simple as the kink in a hairpin which prevents it from slipping through the hair. A specially designed "kink" technically designated as a "hump" is incorporated in the heavy edge of the rim, enabling it to grip the tire many times more firmly than the ordinary rim. The improved safety results are said to be impressive.

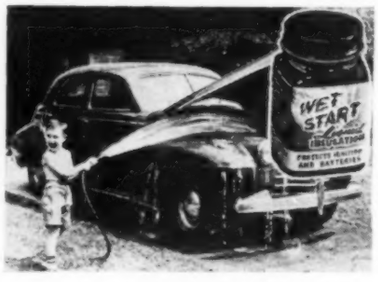
•

Offers New Waterproofing Compound

IN LINE with its expanding service program, under the supervision of F. Dale Bacon, General Manager, Fire Extinguisher Division, the General-Detroit Corporation announces the development of a new product, "Wetstart," which is claimed to eliminate automotive troubles caused by moisture.

Wetstart is designed to make ignition systems waterproof, to restore and protect insulation on wiring, to retard battery corrosion, and to give from six months' to two years' protection with a single application.

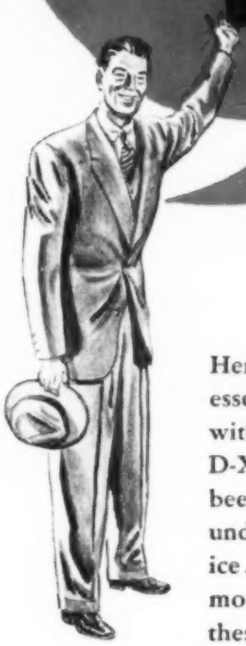
In the accompanying illustration, the camera caught Junior sprinkling the car, in mischief. Although the cracked ignition wires were soaked, the battery covered with water, and spark plugs wells filled to the brim, the engine purred with a single touch



of the starter, immediately after this picture was taken, it is reported. The liquid insulation, Wetstart, had previously been applied by brush to the exposed ignition system wires and parts, including spark plugs, condenser, coil, distributor head, and battery posts, terminals, and carriers.

Also shown is a bottle of Wetstart, which comes in a convenient one-ounce size. . . . More information can be obtained directly from General-Detroit Corporation, 2272 E. Jefferson Ave., Detroit 7, Mich.

The most modern TYPE OF MOTOR OIL FOR SEVERE SERVICE— D-X HEAVY DUTY *can take it!*



Here is the superior, solvent-processed lubricant, a detergent type with extreme pressure qualities. D-X Heavy Duty Motor Oil has been laboratory and road tested under all types of heavy duty service... results prove this modern motor oil can take it! Look at these features:

HIGH DETERGENCY for constant cleansing action.

SLUDGE PREVENTION to inhibit formation of harmful deposits.

DISPERSION to hold disintegrated matter in harmless suspension.

RESISTANCE TO OXIDATION to protect bearings against corrosion.

RESISTANCE TO FOAMING in crankcase service.

Solvent Processed-Paraffin Base

D-X

HEAVY DUTY MOTOR OIL

MID-CONTINENT PETROLEUM CORPORATION

Write FOR **FREE** FOLDER

for complete information on D-X Heavy Duty Motor Oil; also details of the D-X Preventive Maintenance Plan.

For Light Trucks, Commercial Cars

DIAMOND 760 MOTOR OIL

★ ★ ★

For All Diesel Engines

D-X DIESEL MOTOR OIL

MID-CONTINENT PETROLEUM CORPORATION

Waterloo, Ia. Terre Haute, Ind. TULSA Chicago Omaha

New Cooling System Cleaner

THE Radiator Specialty Company of Charlotte, N. C., makers of automotive chemical specialties, announces

the development of a new cooling system cleaner, which is marketed under the trade-name *"Super-Solvent and Cooling System Cleanser"*, bearing the familar *"Solder-Seal"* trade mark.

The makers state that this new product will completely dissolve all rust, scale and sludge into a thin, watery solution which can be flushed out as easily as water. This is an oxalic acid type cleaner that is claimed to be safe to use and that none of its ingredients is harmful to rubber hose, pump packings or delicate metal parts.

As is the custom with all other *"Solder-Seal"* products, this new cooling system cleaner will be distributed through automotive jobbers.

•

New "Mobiloil" Is Announced

A NEW motor oil, originally developed for the Armed Forces, and tested in millions of miles of combat service, is announced by automotive engineers of Socony-Vacuum Oil Company, New York, N. Y.

The outstanding performance characteristics of the new Mobiloil are listed as: (1) The marked ability to reduce deposit accumulations on pistons, rings, valves, bearings and oil screens. (2) Improved lubricating and wear-reducing properties. (3) Maximum protection against bearing corrosion and foaming.

Improved performance, especially in winter, is said to be a noticeable result of the use of the new oil, as not only does the new Mobiloil act to keep engines clean, but it also is claimed to work gradually to remove deposits that have accumulated in older engines.

Socony-Vacuum selected at random more than 100 passenger-cars that had been subjected to wartime driving of between 15,000 and 90,000 miles. The crankcases of approximately half of these cars merely were drained and refilled with new Mobiloil, but in order to obtain accurate records, the pistons and some bearings of approximately 50 cars were removed and photographed. This inspection revealed that while oil screens showed some deposits, the pistons and rings were more or less coated with lacquer and dried-out sludge, which partially or nearly completely clogged the oil control rings.

Several bus operations are cited by the engineers to show the effects of new Mobiloil. One city bus line using both Diesel and gasoline engines finds cleaner engines and ring life ranging from 75,000 to 100,000 miles. Bearing life has been extended from 20,000 miles to at least 75,000 miles. In many instances bearings do not require replacement until 150,000 miles, Socony engineers declared.

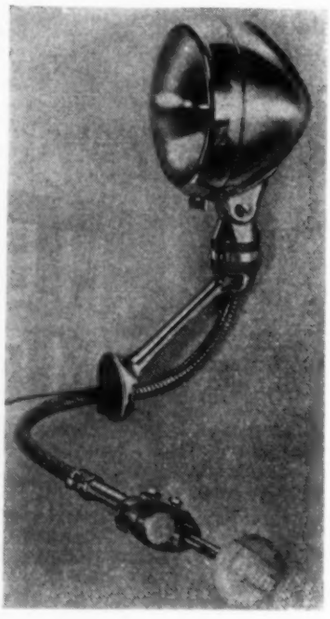
Another operation, using Diesel and gasoline engines, has increased mileage from no more than 15,000 miles to as much as 90,000 miles, before ring replacements are needed. A third, using underfloor gasoline engines, reports that engines are much cleaner and that bearings are running at 100,000 miles, where previously copper-lead bearing corrosion was encountered at 15,000 miles, the engineers reported.

•

Remote Control Spotlight

THE Arrow Safety Device Company, Mount Holly, N. J., announces the availability of the new *"Ivalite"* remote control spotlight, model A-O, illustrated here.

This new spotlight can be mounted on the right-hand side of the vehicle,

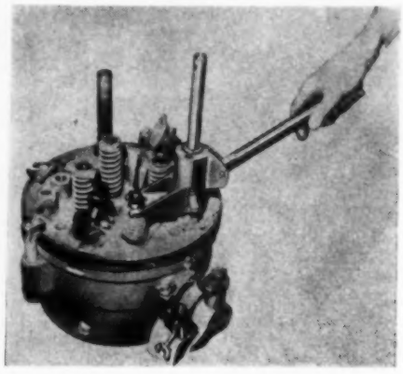


and can be operated by the driver from his side of the dash, by means of the flexible cables and hand grip device shown. It is said to throw a powerful beam of light for a distance of a half mile.

The new lamp is finished in heavy chrome plating. . . . Catalog sheet and other literature will be furnished without obligation, on request.

New Valve Spring Compressor

A NEW valve spring depressor designed for one man operation in dismantling and assembling Diesel engine valves, is now manufactured by the Paxton Diesel Engineering Com-



pany of Omaha, Nebraska. It is called the *"safe-n-ezy"* Valve Spring Depressor and is safe and easy to apply, according to the makers.

The new tool will compress a valve spring to any point and hold it there. This leaves the mechanic's hands free to remove the keepers or pins and then proceed with the job. It does not nick the stud and is so designed that the spring can be released safely and simply, it is claimed.

The *safe-n-ezy* valve spring depressors are available in sizes and models to fit all modern Diesel engines. The tool is ruggedly constructed, lightweight, and easy to store. Prices and literature available on request.

•

New Wagner-Air-Brake Bulletin

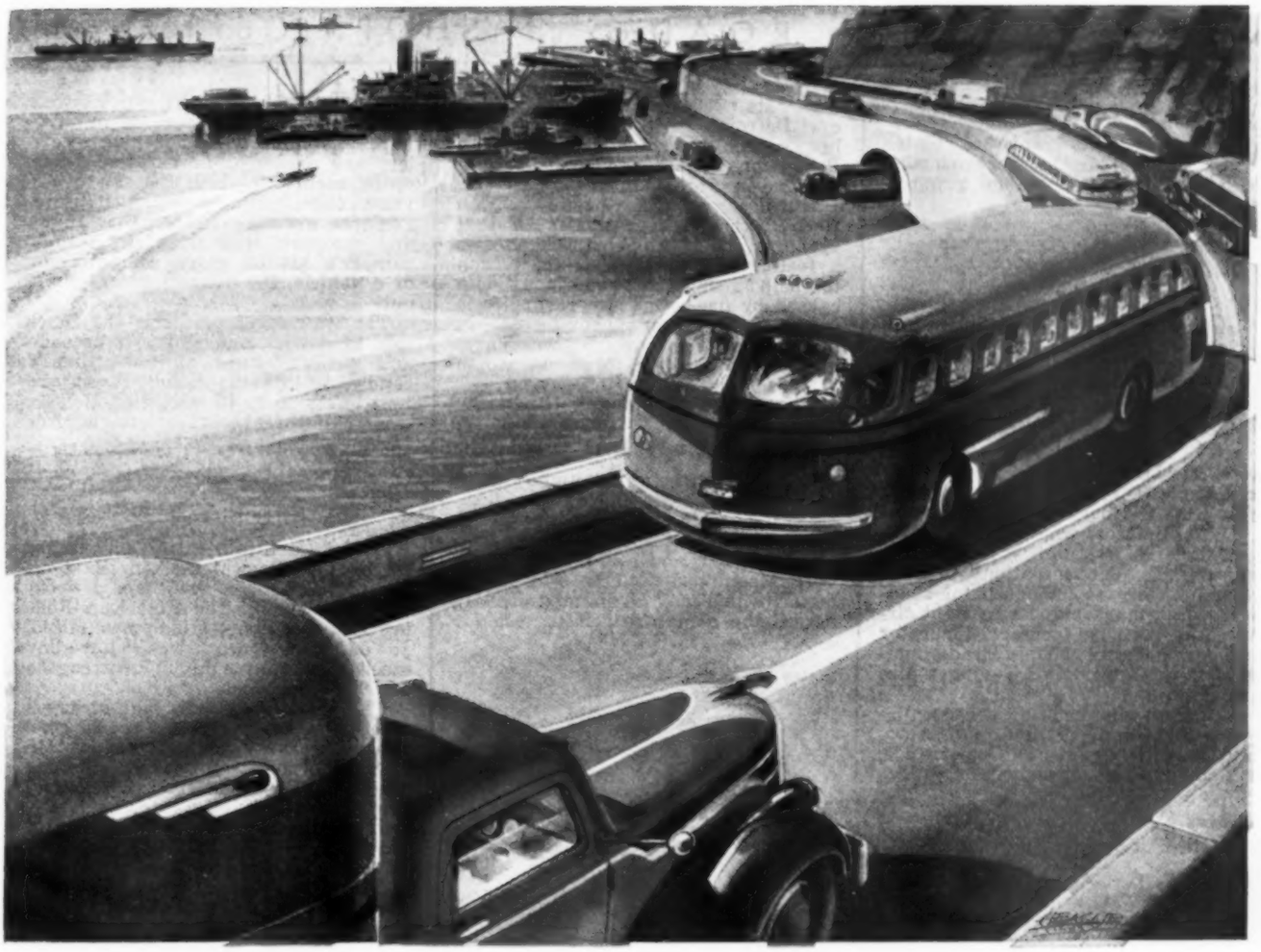
WAGNER Electric Corporation has published a 24-page bulletin on automotive air-brakes, in which various types of air-brake systems are fully explained, with schematic diagrams and photographs.

This bulletin is interestingly written and contains valuable information for anyone interested in air-brakes for motor-truck or bus operation. The function and operating principles of all parts of Wagner air and air-hydraulic brake systems are thoroughly explained.

Perhaps the most interesting feature of the bulletin is the discussion on the Wagner Rotary Compressor for air-brake systems. Drawings and cutaway photographs clearly illustrate the rotary principle used by this new-type compressor, and complete information is given on its construction and performance characteristics.

The Wagner power-cluster is also shown and explained in detail. Wagner engineers produced the power-cluster in order to simplify the application of air-power to hydraulic brake systems.

Several other recent developments in the field of automotive air-brake equipment are thoroughly discussed in this new bulletin, which can be had upon request addressed to Wagner Electric Corporation, 6482 Plymouth Avenue, St. Louis 14, Missouri.



Fleets that "float"—*on land!*

Cle-Air spring control units enable fleets of buses and trucks to "float" along the highways. For Cle-Air units effectively absorb damaging road shocks and cushion spring recoil. Thus they protect vehicle and cargo, and insure riding comfort for driver and passengers. Here are a few of the reasons why Cle-Air units are giving such outstanding performance on commercial fleets:

1. Cle-Air spring control units are not "passenger type shocks" adapted to fleets, but rugged units *specifically* designed for rigorous usage on trucks and buses.

2. Built to aircraft tolerances, Cle-Air units, when properly serviced, *last as long as the vehicle.*

3. Checking the fluid level every 15,000 to 20,000 miles is the only service normally required; this takes but a few seconds with the convenient filler plug.

4. Upkeep costs are negligible; typical is the report of one bus operator whose Cle-Air units have gone 100,000 miles at a cost of only 15¢ apiece for oil.

5. Cle-Air units are dual-acting—hydraulic and pneumatic, identical in principle with our famed Aerol landing gear that safely land 80-ton aircraft.

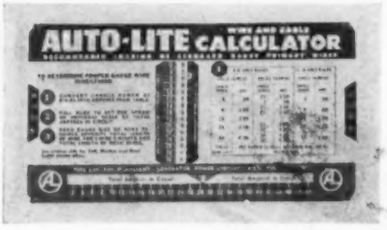
6. These spring control units are backed by Cleveland Pneumatic's nearly 25 years' experience in this specialized field.

For complete information on these outstanding units, write for this free booklet.

THE CLEVELAND PNEUMATIC TOOL CO.
AUTOMOTIVE DIVISION
3781 EAST 77TH STREET • CLEVELAND 5, OHIO

Handy Wire-Gauge Calculator

A POCKET-SIZE rapid calculator to determine the recommended loading of standard gauge primary



wire, has been developed by the Merchandising Division of The Electric Auto-Lite Company.

The calculator, which is printed in appealing colors, allows for the instantaneous determination of the gauge of wire recommended for headlights, tail, marker and rear light circuits, as well as correct generator and power circuit wiring. Trade numbers of the various wire gauges also are shown.

The first allotment of the calculators have been distributed to all Auto-Lite Registered Service Dealers who will supply fleets on request.

•

RMA's Truck Tire Manual

A NEW, revised truck tire manual has been issued by the Rubber Manufacturers' Association, which is said to bring together for the first time in one volume, all previously-published material on the care and maintenance of heavy-duty tires.

Extensively illustrated with photographs and diagrams, the manual is entitled *"How to Get Extra Service Out of Truck Tires"*. Its nine sections add to previously published information the modernization and amplification of tire maintenance practices, the Association said.

Covered by special sections are: Overloading; Over-inflation; Methods of Avoiding Over-inflation; Under-inflation; Effects of Speed, Starts and Stops, Temperature, Road Surfaces, and Mechanical Irregularities Contributing to Tire Wear; Tube-Mounting; Dual Tire Matching; Driver Habits and Inflation Tables.

The new manual was compiled and published by the Service Managers Committee of the Association and distribution is now being made through truck, bus, trailer and tire manufacturers and their branches, distributors and dealers.

•

Poster on Fire Protection

A LARGE, full-color, display poster, stressing the importance in human life and property, of fighting fire before it spreads, has been produced by The General Detroit Corp., and the General Pacific Corp., manufacturers of fire extinguishers and allied products.

Many thousand copies have been distributed free of charge for display in factories, stores, and public buildings. Its preparation is part of General Detroit's continuing campaign to help reduce fire loss. A "Home Fire Protection Chart" is also being distributed in large quantities.

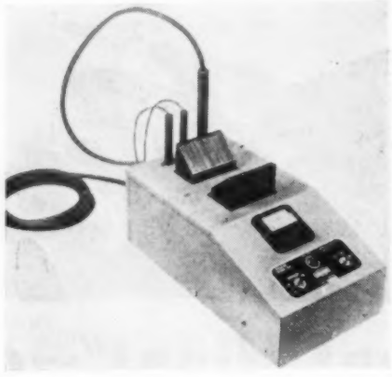
In discussing the poster, F. D. Bacon, the Corporation's General Manager, said, "General Detroit has a feeling of obligation to the nation to help reduce the enormous loss caused by fire. One American life is taken by fire every hour—a yearly toll comparable to recent war casualties. In addition, property worth $1,125,000 is destroyed daily."

•

New Double-Winding Growler

BACK from the wars and now in civilian production is this new, war-created double-winding growler, a product of Lanagan & Hoke, Philadelphia 44, Pa., known as model 444.

It is equipped with an 0-to-30 ammeter, which may be shunted directly across the armature coil to test for



partial opens; the test-light is shielded by a red bull's-eye.

Equipment includes a 7-foot rubber-insulated cord with standard parallel blade connector; switch for ready change from one winding to the other; a pair of prods connected in a test-light circuit for detection of grounds, etc. It will provide standard armature tests for open circuits, grounds and shorts.

•

Offers New Type Flares

WAX fuel tablets similar to those employed by combat troops for cooking and illumination are now being supplied by Socony-Vacuum Oil Company Inc., New York, N. Y. for civilian use.

The tablets, called *"Fire Flares"*, are expected to find wide popularity among campers, providing instant heat for cooking or for kindling campfire logs. For the driver whose vehicle breaks down on the highway at night, they provide both illumination with which to make repairs and warning lights for passing traffic. In the home they can be employed to start log fires, coal stoves and furnaces, and thaw out frozen pipes. They also provide the gardener with a ready means for burning out insect nests.

Fire-Flares are described by Socony-Vacuum as tablets composed of a mixture of high melting-point wax and fine wood flour, encased in wax-impregnated cardboard jackets. Tablets are arranged in bars, of three units, each unit about the size of an yeast cake. Four bars, a total of 12 flares, are packaged together. Light and compact, they fit easily into a camper's kit or glove compartment of a vehicle, the manufacturers point out.

The wax cover performs the function of a wick and makes it as easy and safe to light as an ordinary candle, it is said. Each Fire-Flare unit burns 10 to 15 minutes and costs less than three cents apiece, according to the makers.

•

High-Strength Steel Booklet

DESIGN and fabricating advantages of low-alloy high-strength steels are presented in a new 24-page booklet published by The American Rolling Mill Company, Middletown, Ohio, It describes two Armco low-alloy steels with minimum yield strengths of 50,000 and 55,000 psi.

The booklet tells how high-strength steels enable a lighter sheet steel "shell" to carry more of the load in transportation equipment such as railway cars, trucks, buses, and aircraft parts. This lighter weight—without sacrifice of strength—assures safe high speeds and bigger pay-loads at less cost, it is claimed.

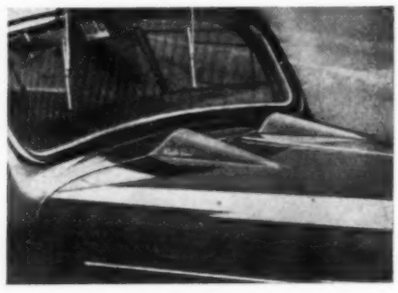
There are sections on drawing, forming and welding, in addition to data on various designs.

A free copy of the booklet, titled *"Armco Low-High Alloy High-Strength Steels"*, may be obtained by writing The American Rolling Mill Company, Middletown, Ohio.

•

"Visio-Vent" Hood Vents

THE Johnson Ladder Shoe Co., Eau Claire, Wis., announces a new product called *"Visio-Vent"* for installation on the hoods of existing automotive equipment, to provide heat from the engine for the removal of



frost, sleet, fog, snow and ice from the windshield.

The device is a vent, placed on each side of the rear area of the hood, through which the fan is said to force motor and radiator heat onto the windshield. It may be operated from the instrument panel, for use only when needed. Patents are said to be pending on this device.

HYDROVAC

1ST IN POWER BRAKING

Hydrovac* leadership in the field of power braking is based on the firm foundation of performance.

More than a million units and billions of miles of service under extremes of operating conditions have emphasized that Hydrovac is by far the most advanced and efficient power-braking unit on the market.

Hydrovac is easily connected into any vehicle's hydraulic brake system and needs no adjustment at installation or in service.

By adding the latent vacuum power of the engine manifold to the hydraulic system, Hydrovac assures smooth, positive stopping with minimum effort for the driver.

For complete information on Hydrovac—the most advanced and best proved power-braking unit, see your Bendix B-K* dealer or write direct:

*TRADE MARKS

Complete Kits available for field installation; Kits include the Bendix Installagraph—a new and simplified type of installation picture that enables any mechanic to make the installation.

BENDIX PRODUCTS DIVISION

BENDIX AVIATION CORPORATION **SOUTH BEND 20, INDIANA**

PRODUCT OF Bendix AVIATION CORPORATION

New Type Flexible Tubing

A NEW type of material called *"Airtron"*, created during the war for aircraft heating and ventilating, is now available as a flexible tubing, to carry hot or cold air, in

sizes from 1 to 6 inches in diameter and in any length desired.

Made of glass, cloth and rubber, it is said to provide high insulation qualities, as well as much flexibility. It is claimed to operate indefinitely under vibration conditions that would cause metal ducting or tubing to show fatigue cracks.

Typical uses for this new material are suggested by the maker, such as in heating, ventilating and air-conditioning of planes, trains, automobiles, buses, homes, etc., and it is said to be unaffected by air, light, water, gasoline, oil and all but concentrated mineral acids. It is available in straight lengths and also in flexible angles, as illustrated.

For more information and literature, address Arrowhead Rubber Company, 2244 E. 37th Street, Los Angeles 11, Calif.

•

Goodrich Adds Spark Plugs

A NEW line of spark plugs, manufactured and distributed under its own brand name, is announced by The B. F. Goodrich Company, Akron, Ohio. The line includes 11 types of plugs for commercial use.

In its announcement notice, B. F. Goodrich Company declared that the line was released to the public only after months of research and testing, during which every part of the plug was subjected to intense study before being placed in the product.

Featured is a pre-testing program which guarantees that every plug will render the service for which it is designed, the company says.

•

New Tire Pump by Monroe

A NEW model tire pump has been placed in volume production by the Monroe Auto Equipment Company in a separate plant that has been newly designed, arranged and equipped, it is announced by Brouwer D. McIntyre, president.

Built to specifications approved by the War Production Board and containing several new features, the pump is being manufactured at a rate of more than 1,000 a day, and this will be expanded steadily until the plant's capacity of 10,000 a day is reached. Schedules are being increased as rapidly as possible, Mr. McIntyre said, because of the present demand for pumps growing out of the necessity for car and truck owners to keep their tires properly inflated and in the best possible condition.

A complete unit within itself, the new tire pump plant is situated in Petersburg, Mich. It is the fifth plant to be put in full operation by the Monroe company. Two, including the main factory, are in Monroe, Michigan, and the others are a short distance outside that city. Superintendent of the pump plant is M. C. Spalding.

•

All-Purpose Soapless Cleaner

A NEW all-purpose soapless cleaner that is claimed to make suds instantly in hard, soft or sea water and to clean pretty nearly everything, including grease-caked machinery, has been recently announced.

Marketed under the name of "K-P", the new cleaner is prepared in powdered form and is packed in 50-lb. cartons and 350-lb drums. It is said to contain no abrasives and to be entirely soluble.

The cleaning action of "K-P" has been tested in aviation, machine tools and the automotive industry. It is made by K. P. Chemical Company, 16 West 46th St., New York, N. Y., and will be distributed through jobbers, supply houses and sales representatives.

•

New Cooling System Additive

THE Radiator Specialty Company of Charlotte, N. C., makers of automotive chemical specialties, announces

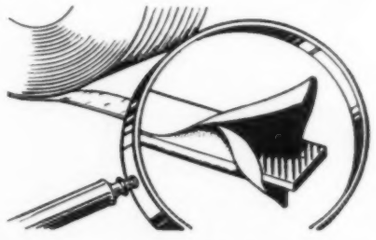
the development of a new water pump lubricant and anti-rust additive.

This is described as a specially-prepared soluble oil for "lubricating" the interior of cooling systems and thus preventing the formation of sludge, rust and scale. In use it is simply added to the coolant and it will work with any reliable anti-freeze solution, the makers state.

It is also declared to completely stop squeaks, squeals and chattering produced by dry water-pump bearings, and to often stop water-pump leaks. Its trade-name is *"Water-Pump Lubricant and Anti-Rust"*, and it bears the familar *"Solder-Seal"* trade-mark.

"Insulated" Box Strapping

THIS tough, pliable, new box strapping, bearing the name *"Fiber-Steel,"* consists of a highly-flexible steel band core, sheathed in a tough kraft paper which has been water-



proofed. The smooth, wax-finished, water-repellent cover is scuff-resistant and provides proper tension without excessive biting into a corrugated box.

The new type strap can be applied directly to enameled or painted surfaces without danger of marring, and can be handled by any operators without danger of cut fingers. Because of its paper covering, trade-marks and company names can be printed directly on it.

Full information on the new strapping may be obtained by writing to A. J. Gerrard & Co., 221 North La Salle Street, Chicago 1, Ill.

•

New Explosive Rivet

AN explosive rivet especially adapted to meet the needs of peacetime mass production methods is announced by E. I. du Pont de Nemours & Company. This improved rivet is the latest development in the explosive type of "blind" fasteners used extensively by the aircraft industry during World War II. They are fastened in place by firing a small explosive charge within the shank of the rivet.

Retaining basic features of previous types, the improved design eliminates the necessity for close tolerance drilling and provides rivets which will accommodate a wide range of metal thicknesses. These features are in direct contrast to those of the explosive rivets supplied to aircraft manufacturers where precision tolerances and a wide variety of lengths were required.

After explosive rivets are in place, one person applies the tip of an electrically-heated iron to the rivet heads. Heat fires the explosive charge within approximately two seconds. The shank of the rivet is expanded to fill the hole completely and a barrel-shaped head is formed on the "blind" end to lock the rivet securely in place. The strength of these rivets is only slightly less than that of conventional solid rivets, it is claimed.

These improved rivets are now provided in ⅛", 5/32" and 3/16" diameters, the Du Pont Explosives Department says, and will be produced in additional sizes. They are made of various materials, including several aluminum alloys, brass, copper, mild steel and Monel metal.

Bus Line finds way to keep brake system trouble-free — rings clean!

Here is one of the 14 units operated by the 25-year-old Nassau Bus Line over Long Island-New York suburban routes. Eric Weberbauer, maintenance superintendent of the Bee Line Bus Company, subsidiary owner of the Nassau Line, reports below on results this line has had with Gulf Dieselube H.D.—tags it "the best oil we've used!"

"THERE WAS A TIME when we had to clean unloading valves in our air compressors almost every two weeks," says Eric Weberbauer, of the Bee Line Bus Company, parent company of the Nassau Bus Line.

"But, since using Gulf Dieselube H.D. in our Nassau Line, our air appliances have stopped clogging up and our power brake system has been free from trouble. Dieselube keeps the parts clean. It prevents the formation of harmful gum.

KEEPS MOTORS CLEAN TOO

"And, believe it or not, in the year we've been using it in our engines, we've never had a ring stick. Before we used Gulf Dieselube, we had plenty of trouble and rings used to stick solid.

"When you come right down to it," continues Mr. Weberbauer, "there's no comparing Gulf Dieselube H.D. with other oils — for Dieselube *keeps motors clean!*

"We've noticed the crankcase is a lot cleaner; valve chambers, strainers, they're all free from sludge and gum.

"Dieselube H.D. simply doesn't gum up or clog the motor.

"On the basis of results, Gulf Dieselube H.D. is the best oil we've used!"

Find Out Today What Gulf Dieselube H. D. Can Do For YOU.

Just Write, Wire, Or Phone To Your Nearest Gulf Office!

GULF

DIESELUBE H.D.

For Heavy-Duty Gasoline and Diesel Engines

Haskelite Opens New Branch Office

HASKELITE Manufacturing Corporation of Grand Rapids, Mich., announces the establishment of a branch office in Philadelphia, Pa. . . . In charge of this new office will be Gordon D. Beckwith, sales engineer. . . . Mr. Beckwith has been associated with Haskelite for several years, having recently been associated with the district office in New York City. . . . Haskelite manufactures plywood, Plymetl, Phemaloid, Plymold and other laminates.

•

Pharis Announces Neoprene Tube

THE Pharis Tire & Rubber Company, Newark, Ohio, announces that good performance has been received from their new Pharis-Dupont Neoprene tube. . . . Pharis is approaching full production on automobile tires and tubes and bicycle tires and tubes, and factory officials expect that manufacturing quotas will be greatly increased during the early part of 1946.

•

U. S. Tire Opens Charlotte Branch

THE U. S. Tires Division of United States Rubber Company has recently opened a branch at Charlotte, North Carolina. . . . W. O. Boone, formerly district manager at the Dallas branch, has been appointed district manager at the new branch. . . . He joined the company in 1934, as a salesman at Atlanta.

•

Kerley Heads Aeronautical Research

ETHYL Corporation announces the appointment of Robert V. Kerley as director of aeronautical research. . . . He succeeds S. D. Heron, who is retiring from active supervision, but who will remain as a consultant. . . . Mr. Kerley's headquarters will be at the Ethyl Research Laboratories in Detroit.

•

Simpson is New Miley Representative

IT has been announced by E. G. Jacobs, general manager of the L. J. Miley Company, Incorporated, Chicago manufacturers of brake linings, brake shoes and brake products, that D. L. Simpson is now representing Miley, in the Pittsburgh and western Pennsylvania area. . . . Mr. Simpson will function as a manufacturers' representative.

General Tire to Make Refrigerators

THE General Tire & Rubber Company, Akron, Ohio, and The Liquid Carbonic Corporation, Chicago, Illinois, in a joint statement, recently announced the formation of Frostor, Incorporated, and the introduction of a new combination refrigerator and freezing unit for the home. . . . The combination brings together General Tire's background of manufacturing standards, dealer relations and public confidence, and Liquid's 45 years of experience in the commercial refrigeration field.

•

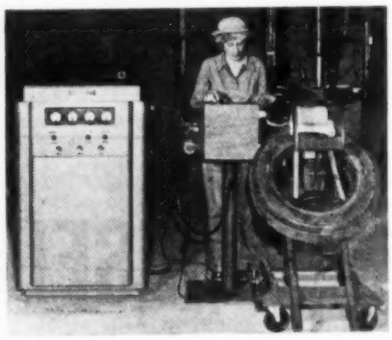
Plans Production on Butyl

THE United States Rubber Company plans to be in mass production of butyl inner tubes early in 1946, it was recently announced. . . . During the the war their manufacture had been solely for military use. . . . The ability of butyl tubes to retain air much better than natural rubber tubes, and its superior tear-resistant properties, are cited as among its more important advantages.

•

Noyes Handles Arrowhead Sales

THE Arrowhead Rubber Company, Los Angeles, Calif., announces the appointment of Earl F. Noyes to the post of sales manager. . . . Mr. Noyes was previously with Sperry Gyroscope Company and will have charge of the development of new markets for Arrowhead's "Airtron", a war-born fibre-glass-rubber material.



ONE of Uncle Sam's WACs helps to extend the life of damaged truck tires with electronic vulcanizing equipment. This is one of the many jobs that WACs were doing to release soldiers for front-line duty.

Lempco Forms Automotive Division

LEMPCO Products, Incorporated, Bedford, Ohio, has formed a separate automotive division, with headquarters at 2953 East 55th Street, Cleveland, Ohio. . . . All correspondence pertaining to Lempco replacement parts only, such as axles and gears, should be mailed to this new address for prompt handling. . . . George J. Barsa, who has been with Lempco for 17 years, will be general manager of the new automotive division. . . . New lines, in addition to the axles and gears, now handled, will be announced shortly.

•

To Export Malabar Equipment

A CONTRACT for export sales between the Menasco Manufacturing Company, Burbank, California, and the American Steel Export Company, New York and Los Angeles, was recently announced. . . . According to J. C. Lee, president of Menasco, a drive for exports of Malabar specialized industrial, railroad and automotive jacks, ranging in lifting capacities of from 1½ to 200 tons, is being inaugurated immediately.

•

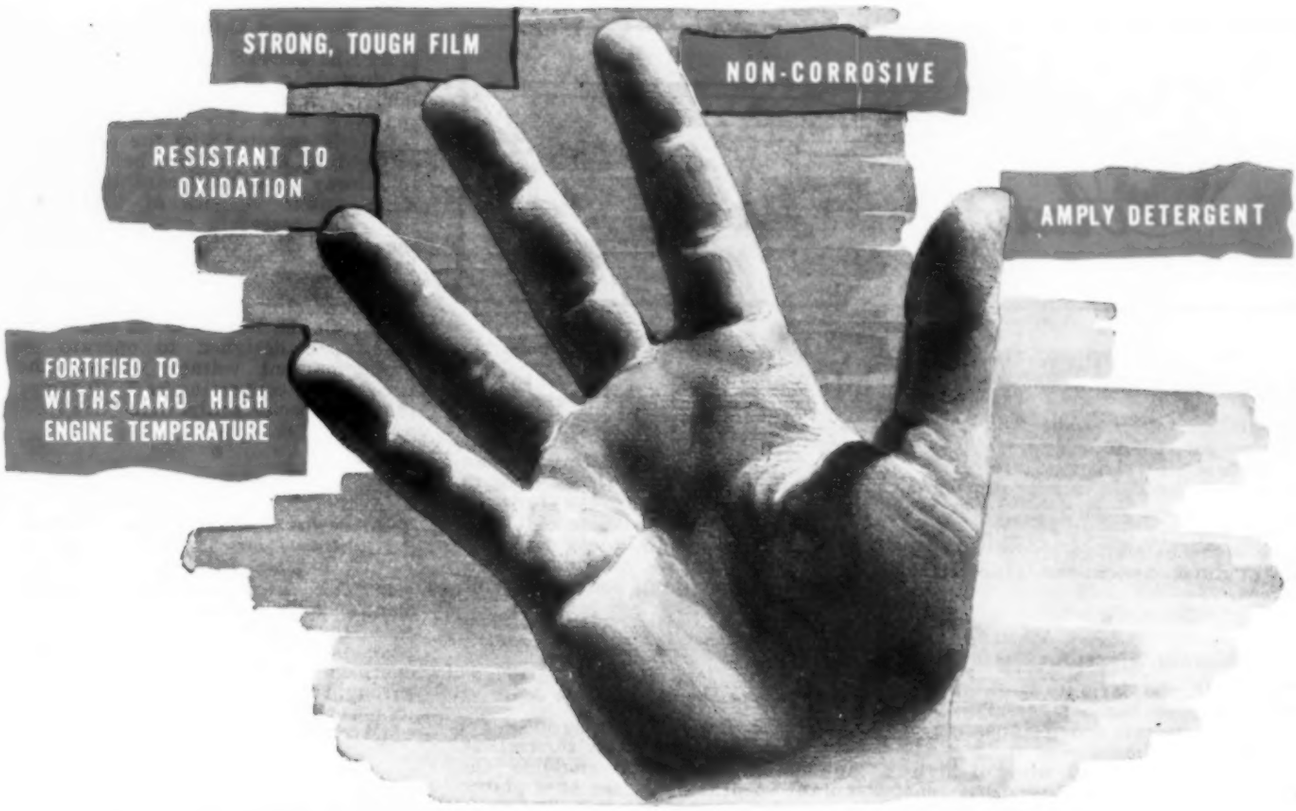
Rosser and Lofquist Appointed at Ethyl

THE Ethyl Corporation recently announced the appointments of George P. Rosser as assistant manager of the Kansas City division, and of Gerald A. Lofquist as assistant manager of the Chicago division. . . . Mr. Rosser joined Ethyl in 1930 and served as assistant manager of the Atlanta division, before entering military service in 1942. . . . Mr. Lofquist became associated with Ethyl in 1939 as a field engineer in Illinois, and has been safety engineer with the Chicago division for the past three years.

•

Walter Parrish Joins Rogers Diesel

THE Rogers Diesel & Aircraft Corporation, New York, N. Y., announces the appointment of Walter Parrish as chief engineer. . . . Mr. Parrish for the past five years was executive engineer at the Superior Engine Division of the National Supply Company. . . . Previous to that he was associated with The Buda Company, as chief engineer for gasoline and Diesel engines. . . . Other experiences include posts with Caterpillar, Cummins, Packard and Continental.



THE FINGERS OF YOUR HAND TELL THE STORY OF *Heavy Duty*

Look at your hand. Notice how your fingers are of various sizes . . . yet they all blend into smooth, strong action. That pretty well tells the story of Wolf's Head Heavy Duty Oil. The five characteristics which every heavy duty oil should have are expertly blended in Wolf's Head Heavy Duty in just the right proportions. The result is a Heavy Duty Oil that cannot be surpassed.

All heavy duty oils, to some extent, have one or more of these characteristics—but Wolf's Head Heavy Duty Oil has—*all five.*

Leading operators of truck and bus fleets specify Wolf's Head Heavy Duty Oil because it has the quality to stand up under overload conditions—and it has the quality to cut down engine wear and reduce operating costs. Proof of Wolf's Head Heavy Duty performance is contained in our booklet "Heavy Duty Maintenance." Write for your free copy to Wolf's Head Oil Refining Co., Inc., Oil City, Pa., or New York 10, N. Y.

LABORATORY CONTROL SERVICE

Gives fleet operators specific recommendations for their units, based on analysis of crankcase oil. Helps to establish correct drain periods, conserve engine life, reduce lay-ups—frequently reveals unsuspected engine troubles. Free and without obligation.

WOLF'S HEAD

MOTOR OIL AND LUBES

100% PENNSYLVANIA P.G.C.O.A. Permit No. 6

In the Automotive World

"Jeep" Trade-Marked in England

THE Willys-Overland Motors has been issued a British trade-mark registration on the word *"Jeep"*, it was announced recently by Charles E. Sorensen, president. . . . The trade-mark certificate of registration was issued to the company on December 1, and provides Willys with the prima facie right to market motor vehicles in England under the trade-mark *"Jeep"*.

•

Helicopter Services Are Planned

ONE of the largest operators of passenger buses is seeking permission to operate fourteen-passenger helicopter air buses over their existing network of 60,000 miles of highway. . . . It has been reported that this air-bus service will be closely coordinated to the company's existing garage and bus terminals, which would be adapted for landings and hangar space.

•

Bank Puts Branch Office on Wheels

MANY small communities in Maine are now being serviced with banking facilities from an especially-designed trailer. . . . This unique traveling bank proudly presents a special teller's cage, cashier counter, and a private office for business consultations. . . . It is complete with the necessary banking equipment, including a burglar-proof safe. . . . Service is provided on a regular schedule to neighboring towns within a 25-mile radius of the main office.

•

Heads REA Public Relations

THE Railway Express Agency announces the appointment of Wm. W. Martin as superintendent of public relations, with offices at 230 Park Avenue, New York. . . . Mr. Martin has been associated with the express company for the past 33 years. . . . He succeeds R. G. McLain, who was recently named manager of air express, eastern department of the company.

•

California Bridge Accidents Jump

A TRIP across the San Francisco-Oakland Bay Bridge is coming to seem a dangerous mission. . . . In a recent 5-month period, an average of 32 cars broke down each day, requiring service personnel and equipment to clear them from the bridge lanes. . . . This is a large increase over the same period last year when the daily breakdowns averaged slightly more than 26 cars a day.

Memorials Suggested for Roadsides

NOW that the time has come to propose the erection of various war memorials throughout the nation, some highway engineers have suggested that no more fitting tribute could be paid to our heroes than to establish memorials in the form of useful roadside beautification projects. . . . Among the ideas set forth are: tree planting, wayside stops, picnic spots, parking areas at scenic spots, and others.

•

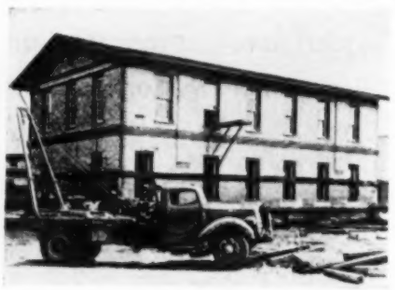
New Idea Short-Cuts Service Jobs

ARMY and Navy training ideas are now being applied to civilian automotive mechanics, enabling the worker to practically see at a glance how to handle the installation of various parts. . . . This new instruction system makes use of visual training techniques employed by the Armed Forces. . . . It presents the installation information in two forms, one being a blow-up view of photographed drawings, showing the unassembled parts in their relationship to each other. . . . The other view, known as the "perspective assembly view", shows the part assembled in its proper place.

•

Dublin Does a Bit of Road Planning

PLANS are reported for changing all main traffic arteries radiating from Dublin, Ireland, into superhighways at a cost of about $20,000,000. . . . The highways would be from 30 to 136 feet wide and would include lanes for motor vehicles, bicycles and pedestrians. . . . The program is said to be based on a study of major pre-war road projects in the United States and Europe.



THIS two-story brick building was moved intact for a distance of 330 feet. . . . According to L. A. Bang, head of Bang House Moving Company, Houston, Tex., the power for moving it was furnished by this Mack.

Fluorescent Lighting for Buses

EXPERIMENTS are being conducted in the use of fluorescent lamps in new cars being designed for the New York City Transit System. . . . It is expected that the new form of lighting may appear, before long, in subway cars, street cars, buses and other public vehicles of that city. . . . The research, conducted under the N. Y. Board of Transportation, has resulted in a fluorescent lamp which will stand rough treatment. . . . Most important development is that both the lamp and its own auxiliary are designed to operate on direct current voltage without the necessity of converting to A. C. power through special equipment.

•

NHUC Increases State Service Staff

THE state services of the National Highway Users Conference will be greatly expanded during the coming year. . . . Eight eminently qualified men, including some who have been with the Conference several years, have just been assigned to further energize highway-user objectives throughout the states. . . . State services work is now under the direction of Mr. Russell E. MacCleery.

•

Alaskan Highway Work Is Approved

APPROVAL of priorities for work and equipment necessary for upkeep and improvement of Alaskan highways, to cost $5,200,000, has been granted to the Alaska road commissioner by the Civilian Production Administration, it recently was announced.

•

Scotland Had A Road Tax 400 Years Ago

SCOTLAND had a road maintenance tax some 400 years ago. . . . In the early sixteenth century, the Canongate was one of the first paved streets in Edinburgh. . . . It was also the main street of the medieval Scottish capital. . . . Empty cars and wagons using the Canongate were compelled to pay a tax of one half-penny every time they travelled along the street. . . . Loaded carts and other vehicles paid a tax of one penny to "repair and maintain the causeway."

•

Council Against Transport Monopoly

STOCKTON-on-Tees Rural District Council of England has struck a blow for free enterprise, in rejecting a proposal that the Durham County Council consider a government-owned bus service. . . . The Rural Council contended that transportation service should be left in the hands of private enterprise and that the County proposal would create another unwanted monopoly.

•

Plans Made To Beautify Bulldozers

ONE of America's largest builders of bulldozers, dump trucks, winches and cranes, has announced the engagement of a leading engineering designer to restyle and streamline these motor vehicles.

Here's information you can use, NOW!

New FIBERGLAS* ELECTRICAL INSULATION MATERIAL BOOKLET . . . TELLS WHAT TYPE TO USE, WHERE AND HOW . . .

This free, new booklet will be helpful to anyone concerned with design manufacture or maintenance of the electrical equipment of buses, trucks and other commercial vehicles.

It will help you determine which of the many types of Fiberglas electrical insulation materials should be used for a specific job.

The booklet will show you where this better insulation material can be used advantageously for electronic, radio and electrical applications.

It will indicate the ways to use Fiberglas electrical insulation material to obtain all of the benefits which it affords.

Containing complete information about Fiberglas, the new booklet illustrates Fiberglas fibers and filaments twisted into yarns, served on wires, woven into tapes and cloths, braided into sleevings and formed into tying cords.

It describes the unique combination of electrically and mechanically important characteristics of Fiberglas such as: high temperature, moisture and acid resistance, favorable space factor and high tensile strength. It shows how the insulating impregnants increase the effectiveness of Fiberglas' inherent characteristics and add others such as high dielectric strength, insulation resistance and resistance to abrasion.

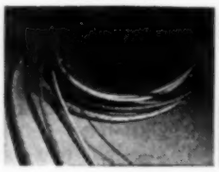
You will see why the use of this basic, inorganic, insulating material is increasing so rapidly—why so many designers, manufacturers and repair shop operators prefer it.

Be sure to have a copy of this new booklet in your file for ready reference. Write for your copy today —there is no obligation. Address: *Owens-Corning Fiberglas Corp., 1962 Nicholas Bldg., Toledo 1, O.*

In Canada, Fiberglas Canada Ltd., Oshawa, Ontario.

Fiberglas varnished cloth and tape

Fiberglas insulated wire



Fiberglas tying cord

Fiberglas saturated sleeving and varnished tubing

Fiberglas laminated plastics

Fiberglas-mica combinations

FIBERGLAS

*T. M. Reg. U. S. Pat. Off.

ELECTRICAL INSULATION MATERIAL

WHEN SHOULD FLEET VEHICLES BE RETIRED?

(*Continued from page* 74)

is used, as long as the freight is delivered in good condition and promptly.

The passenger, on the other hand, is extremely interested in the vehicle in which he will travel. Where competitive routes exist, since the fare is the same, he will select the route which furnishes the bus offering the greatest promise of comfort and luxury.

It may be, and often is, true that the new vehicle will cost more to operate and maintain than the old vehicle which it replaces. I believe most inter-city bus operators will agree that modern rear-engine or underfloor engine buses cost more to maintain than do old-style conventional buses with the engine under a hood out in front.

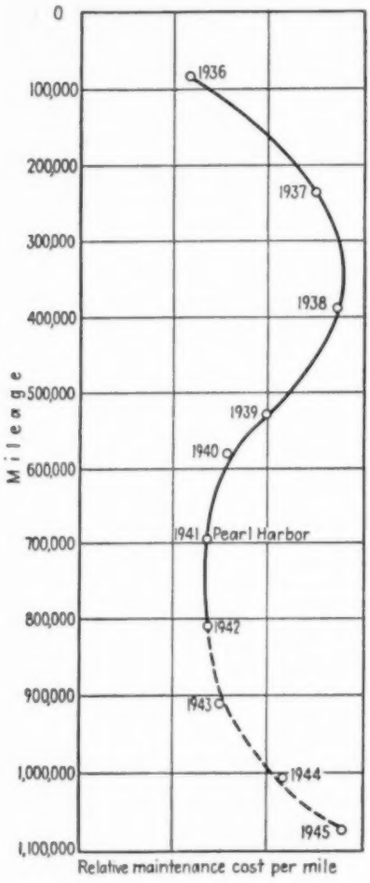
Consider this situation: You and your competitor both operate from city "A" to city "B" and, of course, charge the same fare. You are operating good old reliable economical model "XYZ" coaches that for many years have rendered and are still rendering service at low cost. The seats were the acme of design and quality at the time of purchase, sturdy and hard. In the summer, the windows are opened, so that passengers can be cooled by some nice hot dust.

Your competitor purchases a fleet of up-to-date, modern, air-conditioned buses for this route, all equipped with modern seats having air-foam cushions. How many passengers do you think will ride your old-fashioned, economical bus? Is it not obvious that if you are to stay in business, you must replace your old fleet (regardless of its age or operating cost) with attractive air-conditioned buses, even though, as a result, your operating costs may increase? In normal times, when you are fighting for patronage, if you can attract two more passengers per schedule, you will probably be better off, even though the maintenance cost may be doubled as a result.

I do not believe in the common conception that the maintenance costs of intercity buses gradually increase with age. Proper maintenance of inter-city buses requires that their various parts be periodically renewed. After a bus has operated several hundred thousand miles under such a program, it may be exceedingly difficult to determine what parts of the vehicle, if any, were the original parts. This being the case, after the vehicle has traveled far enough (say about four or five hundred thousand miles) from then on, the average age of the parts in the vehicle does not increase. A leveling-off process of maintenance costs results. From then on, maintenance costs tend to remain the same and later may actually decrease. I have several times experienced this result in fleets of motor vehicles.

Accompanying this paper is a curve on which is plotted the actual average maintenance costs of a fleet of buses that we have been operating since 1936. I have not shown the actual maintenance cost per mile, since the actual figures would be of little value, as they will vary from model and from one type of operation to another. However, the curve is of interest, in showing a general trend. Had it not been for the increase in maintenance cost, caused by the war, I feel confident that the 1944 and 1945 figures would have been equal to or below the 1943 figures.

AVERAGE MILEAGE PER BUS FLEET PURCHASED IN 1936



It would, therefore, appear that as far as the inter-city bus industry is concerned, maintenance cost is *not* a criterion in determining when buses should be retired. The primary factor in determining when to retire a motor bus is, in my opinion, obsolescence.

The questions, in the order of their importance, that should be answered, to determine if a bus should be retired are:

1. What is your competitor going to do?
2. How many additional passengers will be influenced to ride on your line as a result of new equipment?
3. What fuel savings, if any, will be secured through the use of the new equipment?
4. How will the maintenance and other operating expenses of the new equipment compare with that of the old equipment?
5. What will be the effect on the morale of your entire organization as a result of the new equipment?

I realize that these are all abstract questions, but they are fundamental in arriving at a solution to the problem. Conditions vary from year to year and from month to month. A good plan of retirement for today may be a very poor one for next year.

●

"Wear Standards Are Needed"

(*Continued from page* 74)

reflected that fact. This is not unnatural. By far the largest proportion of a utility's capital investment is in durable goods—long-lived furniture are about the only short-lived articles it purchases, and certainly neither of these items undergoes the vicissitudes of life to which a motor vehicle is subjected.

Depreciation policies are usually based on past experience, subject to annual revision, and retirement is decided on a comparison of book values and repair costs for a group of similar vehicles. At the moment, there is probably no better way of working out the problem. However, the annual revision of any depreciation policy should involve not only a consideration of the past years' performance, but an attempt to predict the future. This is a difficult matter.

The next three factors—Operating Conditions, Maintenance Policy and Concentration of Fleet—are so interdependent that it is almost impossible to discuss them separately. The weight that should be given to these factors varies, and must be evaluated by each transportation superintendent, in the light of his own peculiar conditions.

Market conditions likewise need no special comment, as the effect of a strong buyers' or sellers' market on retirements is self-evident.

The most important factor of all is the last one listed—the mechanical condition of the particular vehicle under consideration for retirement. What true basis have we for determination of its condition? Going back to our definition of depreciation as "disparagement," I am very much afraid that we are prone to look at the age and mileage of the vehicle

(*Please turn to page* 156)

FOR PROTECTION OF CARGO, EQUIPMENT AND POCKETBOOK . . . .

PRIOR *Safety* TANK *and* TOOL CHEST SETS

ATTRACTIVE and ECONOMICAL

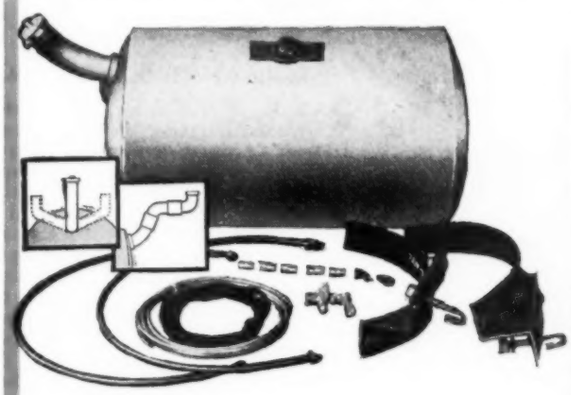
Sturdy construction . . . large fuel capacity . . . a safe and handy place to keep tools . . . a special jack well to keep the hydraulic jack standing up, so that the fluid can't leak out . . . and special curved angle iron suspension to give greater road clearance—those are some of the features of the Prior Safety Tank and Tool Chest Set.

The large fuel capacity means less fueling stops on long runs. The safety fuse plug guards against explosion from fire or excessive heat. The full dished heads and the cylindrical construction give the tanks greater resistance to damage from external causes.

The four-way tread on the tool chest cover makes it a serviceable cat-walk and adds to the attractive appearance of the entire assembly.

Prior Safety Tank and Tool Chest Sets can be installed without drilling any holes in the chassis frame.

This End-Fill Safety Tank Fits any Truck or Bus



This 18" single tank has an *adjustable* end-filler tube that can be adjusted to any right or left angle to fit any truck or bus. It also may be extended and angled to conform to structural details of the bus or truck. It comes complete, ready to install, down to the last nut. *It fits either side of the vehicle.*

ELECTRIC Gas Gauge, with dash indicator, may be had for any Prior Tank. This is optional equipment at extra cost.

When you buy Safety Tanks—buy Prior Safety Tanks.

Prior Products

DALLAS, TEXAS • CLINTON, ILLINOIS

WRITE OR WIRE FOR NAME OF NEAREST DEALER

This Book...

REVOLUTIONIZED MATERIAL HANDLING

...it defined and crystallized the unit packaging method

The publication of this book started men of industrial plants and railroads thinking along new lines.

Out of this book stemmed the material handling principles and methods that have enabled the Army and Navy to successfully handle in this war the burden of supplies, munitions and equipment.

Use the coupon below for your copy.

CLARK TRUCTRACTOR DIVISION
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I would like a copy of your book "CLARK CARLOADER METHOD"

Name_____

Company_____

Address_____

City_____ Zone_____ State_____

New Packard Taxicab

(*Continued from page* 124)

streets, the new type seat can be swung to the rear and the two extra passengers can enter the left rear door, swing the front seat forward, and then sit down.

Another innovation is a power-operated rear window, which the driver can open by pressing a button on the instrument panel, for ventilation, cooling, etc. The taximeter is placed in the instrument panel, thus gaining extra interior room and the meter flag is plainly visible through the windshield. Luminous paint makes it readable at night.

The Clipper's 6-cylinder engine has been improved; a new positive crankcase ventilation system is mentioned. The new doors are of the rotary-latch type; a red light on the instrument panel indicates to the driver that the doors are open. The new cab has a 120-inch wheelbase and a turning radius of 21 feet.

Packard also currently announces a line of "commercial" cars, including 7-pass. sedan, limousine body and hearse—all on the Clipper chassis, but with longer wheelbase.

•

Servicing a Diesel Fleet

(*Continued from page* 68)

thetic tires to heat up much more than the old natural rubber tires, and like everything else, during a period of war scarcity, they have to be carefully watched, if one is to get any *real* service out of them at all.

•

Morrison Heads Timken Brake Div.

RAY L. MORRISON heads the new Brake Division of the Timken-Detroit Axle Company, it was recently announced. . . . Mr. Morrison is well known in automotive circles. He brings to the newly-created division a background of more than 25 years' experience in the development, manufacture and sale of automotive brake equipment. . . . Previous to his new connection, he was vice-president and general manager of the Bendix-Westinghouse Automotive Air Brake Company. . . . Ralph K. Super, for the past six years brake engineer for Timken Axle, will serve the newly-formed unit in the capacity of brake division engineer.

NEW! BLOWOUT-PROOF RUBBER RIVETS SAVE TIRES

SPEAKER Rubber Rivets seal nail holes and small breaks. A quick pull on the wire needle makes a repair that outlasts the tire. Prevent fabric rot and blowouts with Rubber Rivets. Get some from your jobber today.

J. W. SPEAKER CORP.
Milwaukee 12, Wis.

STRENGTH

Take a good look at the STRENGTH and DURABILITY built into these Kingham Trailer Units! See them at your dealers! You'll agree they're 'tops' for DEPENDABILITY!

Solid as a rock of granite . . rugged as the old Wild West . . and powerful as a giant lumber-jack . . that's the STRENGTH of the Kingham Trailer Units. For, right from the ground up—these famous products are built to do a job . . and do it right! Combining only the best in brain and brawn . . each mighty Kingham is made to out-last and out-perform any similar Trailer Unit on today's road.

Why not avail yourself of the best . . it costs no more! See the Kingham at your Dealer . . today!

KINGHAM TRAILER COMPANY, INCORPORATED **LOUISVILLE, KY.**

NATIONAL SALES **Kingham UNIVERSAL** NATIONAL SERVICE

"A Load Behind is a Trip Ahead"

Let your HEAD take you

(The average American today has a choice of just going where "his feet take him", or choosing wisely the course to follow. Let's skip ahead 10 years, and take a look at John Jones—and listen to him . . .)

"SOMETIMES I feel so good it almost scares me.

"This house—I wouldn't swap a shingle off its roof for any other house on earth. This little valley, with the pond down in the hollow at the back, is the spot I like best in all the world.

"And they're mine. I own 'em. Nobody can take 'em away from me.

"I've got a little money coming in, regularly. Not much—but enough. And I tell you, when you can go to bed every night with nothing on your mind except the fun you're going to have tomorrow—that's as near Heaven as man gets on this earth!

"It wasn't always so.

"Back in '46—that was right after the war and sometimes the going wasn't too easy—I needed cash. Taxes were tough, and then Ellen got sick. Like almost everybody else, I was buying Bonds through the Payroll Plan—and I figured on cashing some of them in. But sick as she was, it was Ellen who talked me out of it.

" 'Don't do it, John!' she said. 'Please don't! For the first time in our lives, we're really saving money. It's wonderful to know that every single payday we have more money put aside! John, if we can only keep up this saving, think what it can mean! Maybe someday you won't have to work. Maybe we can own a home. And oh, how good it would feel to know that we need never worry about money when we're old!'

"Well, even after she got better, I stayed away from the weekly poker game—quit dropping a little cash at the hot spots now and then—gave up some of the things a man feels he has a right to. We didn't have as much fun for a while but we paid our taxes and the doctor and—we didn't touch the Bonds.

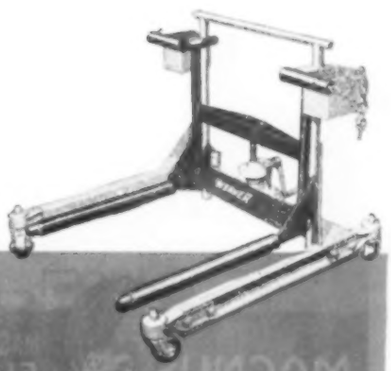
"What's more, we kept right on putting our extra cash into U. S. Savings Bonds. And the pay-off is making the world a pretty swell place today!"

The Treasury Department acknowledges with appreciation the publication of this advertisement

★ ★

WEAVER WHEEL DOLLY

ENABLES *ONE MAN* TO HANDLE JOBS THAT FORMERLY REQUIRED TWO OR THREE STRONG MECHANICS!



When a Weaver Wheel Dolly is used it is no trick at all for one mechanic to handle big tires—either single or dual. Illustration above shows 10.50-22 dual bus wheel weighing 740 lbs. being handled with ease and safety... Screw jack does all the lifting, thus saving strained muscles.

Dolly lifts from floor to spindle. It speeds brake, tire, alignment bearing work or any other job requiring the wheel to be removed.

Lifting arms may be lowered for picking up the wheel off the floor or may be raised under the jacked up wheel to remove it from the spindle.

Illustration at right shows dual wheels resting on dolly while mechanic pushes unit to the service department.

Replacing the wheel is done quickly and easily by raising it to spindle height and turning it on the roller arms until bolt holes meet or keys meet keyways. Strong chain holds wheels upright.

WR-12 Dolly has 1200 lbs. capacity, and is furnished complete with chain and tool holders... For details, consult Weaver jobber or write us.

WEAVER MANUFACTURING COMPANY

SPRINGFIELD, ILLINOIS, U. S. A.

HERE'S a new idea for cleaning automotive parts. Using two famous Magnus cleaners . . . Magnusol for oily, greasy dirt, and Magnus 755 for engine varnish, gum, sludge and carbonized oil . . . this set-up offers speedy, low-cost cleaning of all engine parts and accessories.

Portable · Compact · Roomy

The left-hand compartment of this compact, portable system is big enough to take a complete engine block and a basket of parts at the same time. All work in this compartment is soaked for a few minutes in cold Magnusol solution. The work is then moved to the rinse compartment (the same size as the Magnusol compartment), where it is flushed off with a pressure stream of cold water. Oily, greasy parts require no further cleaning, and are ready for re-assembly or repair.

Small parts with carbonized oil deposits, engine varnish, gum and sludge are given a final cleaning in the small right-hand tank by dipping in cold Magnus 755 solution until deposits are softened. They are then moved to the middle, or rinse, compartment and flushed clean with the pressure water.

This simple, effective set-up will greatly speed up *your* cleaning operations, cut your costs and give you vastly improved results.

Write us for complete details on Magnus Kol-Dip Parts Cleaner, Magnus 755 and Magnusol.

MAGNUS MAGNUS CHEMICAL CO., 36 SOUTH AVE., GARWOOD, N. J.
Fleet Cleaners & Machines

Torque Converters

(*Continued from page 77*)

reason, the high speed ratios above the clutch should not be used in operation. In other words, the torque-converter is much more efficient than the hydraulic coupling in lower speed ratios, whereas, the hydraulic coupling is better in the higher speed ratios.

Therefore, it is desirable to combine these two units in such a manner as to avoid inefficient ranges of either and to utilize only their advantages. This has been done in a rather simple manner. The reason that the efficiency of a hydraulic torque-converter in the higher speed ratios is so low, is due to the fact that the blades of the stationary reaction member offer an obstruction to the flow of oil, thereby decreasing the efficiency. If these obstructions could be removed during the higher speed ratios, the efficiency would increase.

This is done by mounting the reaction member on a one-way clutch or free-wheel unit in such a manner as to hold the reaction member to rotate during the higher speed ratios. A drawing of this unit is shown in Figure 5, and the resulting efficiency and torque curve is shown in Figure 6.

The efficiency curve for the lower speed ratios is exactly the same as the torque-converter efficiency curves shown in Figure 3, whereas the efficiency curve for the higher speed ratios is the same as that of the hydraulic coupling efficiency curve, as shown in Figure 1.

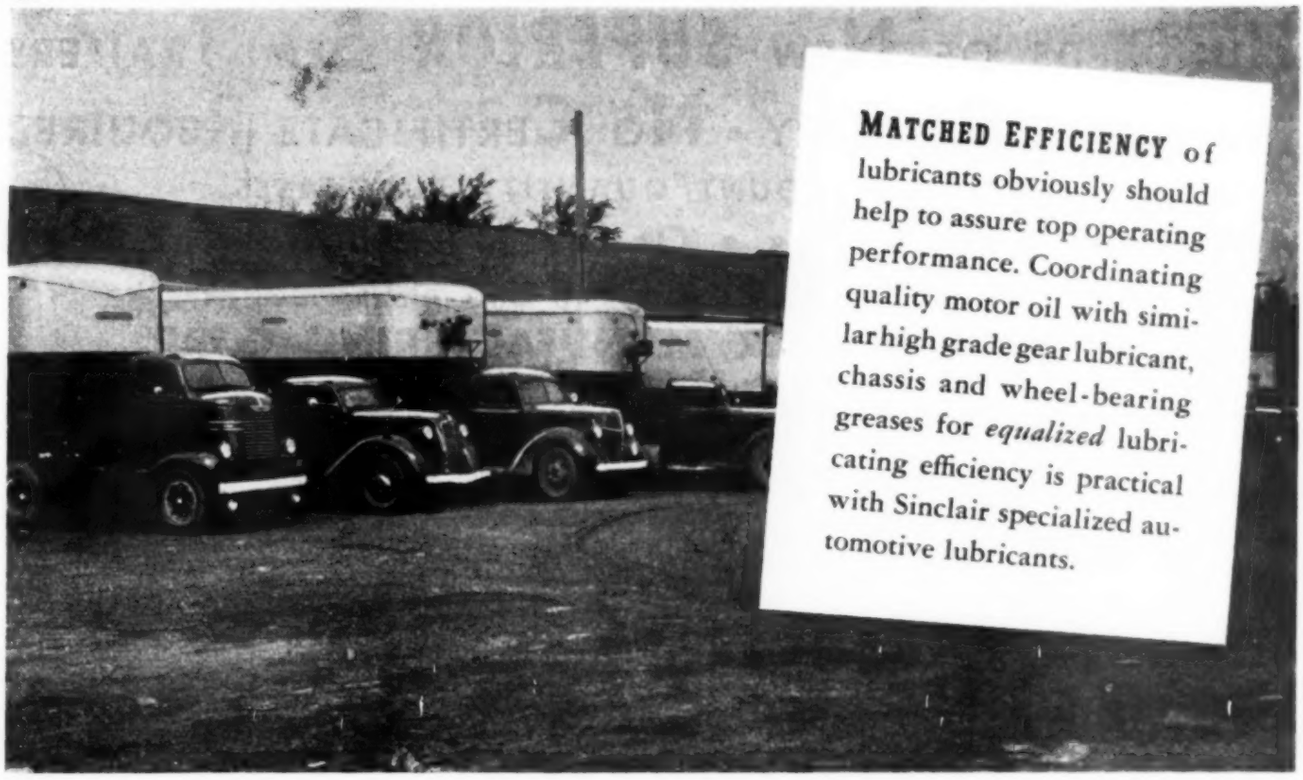
Similarly, the torque ratio curve during the lower speed ratios is the same as the torque ratio curve in Figure 3; whereas, the torque ratio curve for the higher speed ranges is the same as for the hydraulic coupling as shown in Figure 1. The result, therefore, is a hydraulic unit which has the advantages of both the torque-converter and the hydraulic coupling, without any of their inherent disadvantages. A unit of this type obviates the necessity to shift into a direct drive at the higher speed ratios, and full advantage can be taken of the fact that the transmission of power can now be maintained through the hydraulic drive throughout all speed ranges of the vehicle.

Selection of Converters: The im-

Specify
Claw
Double-Duty
TRUCK CHAINS
Columbus McKinnon Chain
CORPORATION
TONAWANDA, N. Y.

SINCLAIR MATCHED LUBRICANTS

for Top Operating Efficiency



MATCHED EFFICIENCY of lubricants obviously should help to assure top operating performance. Coordinating quality motor oil with similar high grade gear lubricant, chassis and wheel-bearing greases for *equalized* lubricating efficiency is practical with Sinclair specialized automotive lubricants.

SINCLAIR OPALINE* MOTOR OIL offers positive engine lubrication, free acting rings, resistance to carbon deposit and crankcase accumulations, avoidance of bearing corrosion . . . OPALINE GEAR LUBRICANT provides extreme pressure lubricating protection to prevent galling and scuffing, resists oxidation under operating temperatures, and is free flowing under Winter conditions . . . OPALINE CHASSIS LUBRICANT has "staying" properties and built-in extreme pressure characteristics . . . and for wheel bearings SINCOLUBE is designed to meet service temperature and pressure requirements, also keep an adequate lubricating film on balls and rollers, with freedom from leakage to brake linings and hubs.

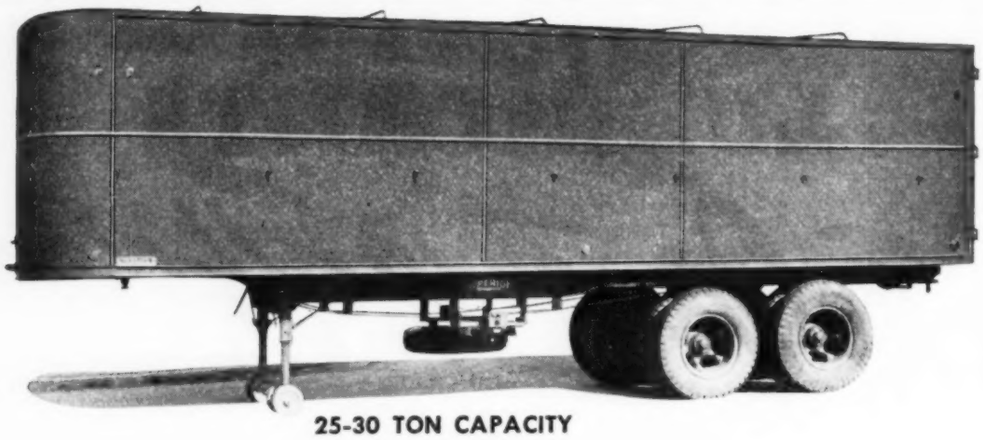
• • •

Try these matched lubricants for top operating efficiency and economy.

* Reg. U. S. Pat. Off.

SINCLAIR LUBRICANTS—FUELS

FOR FULL INFORMATION OR LUBRICATION COUNSEL WRITE SINCLAIR REFINING COMPANY, 630 FIFTH AVENUE, NEW YORK 20, N. Y.



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HUNDREDS OF NEW *SUPERIOR* SEMI-TRAILERS
IMMEDIATE DELIVERY • NO CERTIFICATE REQUIRED

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All Sizes and Types • Orders Filled as Received

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portant factors in the selection of a hydraulic torque-converter are: (1) Maximum efficiency. (2) Maximum torque ratio. (3) Clutch point. (4) Shape of the efficiency curve. (5) Shape of the torque ratio curve.

Generally speaking, if a higher maximum torque ratio is desired, the maximum efficiency is somewhat reduced, and the clutch point moves to a somewhat lower speed ratio, and vice versa. At the same time, the higher the maximum torque ratio, the higher the initial rise of the efficiency curve.

In applying a torque-converter to a specific installation, a considerable thought must be given to these factors. The location of the clutch point in a torque-converter-hydraulic coupling combination is of the utmost importance, since it will determine the area between the dip of the efficiency curve beyond the maximum efficiency and the rising efficiency curve of the coupling.

If the clutch point occurs at a speed ratio of .5, the average efficiency will suffer greatly because of the extreme dip of the efficiency curve to an efficiency of .5. If, however, the clutch point occurs at a speed ratio of .83, the average usable efficiency will increase greatly. Furthermore, since the higher speed ratios are the ratios in which automotive vehicles operate a large percentage of time, the location of the clutch point for this type of vehicle is of even greater importance.

(Now that some of the working principles have been made clear, this publication is planning to obtain, from White engineers, a basic description of their new development in transmissions, which is said to be a *combination* of the hydraulic drive and the hydraulic torque-converter, provided that it can be presented in a manner that the majority of fleet men can readily understand. This will appear, if possible, in a subsequent issue.—*Editor.*)

•

"My wife saw the accident, officer. . . . If you'll let her take complete charge, I'm sure she'll settle the argument and have those two vehicles rolling in a jiffy."

New Synthetic Lubricants

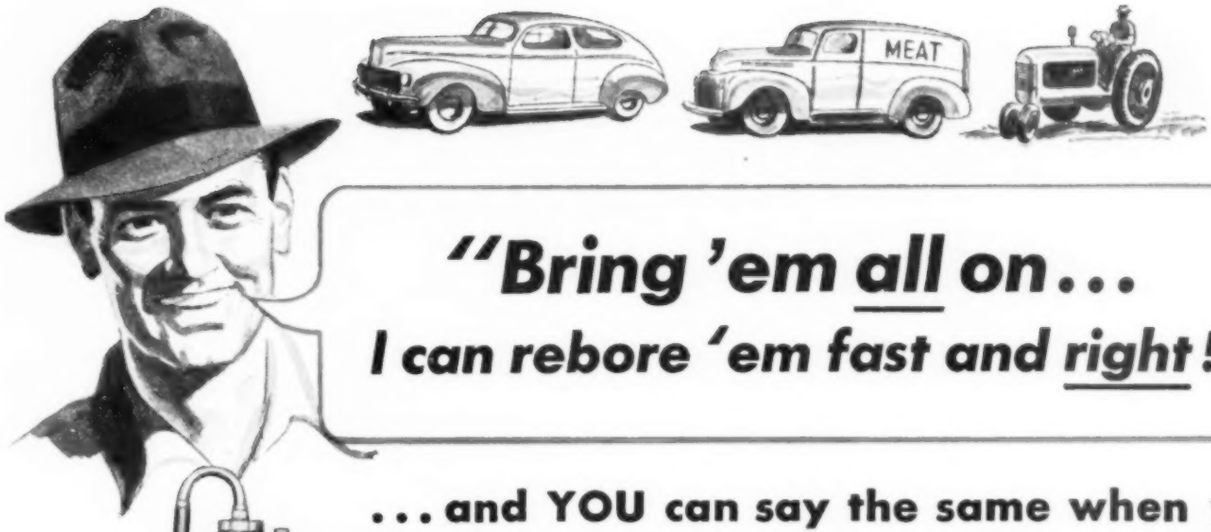
(*Continued from page* 88)

prior to the change. The vehicles involved in these commercial fleets were divided about equally between trucks and passenger-cars."

There were also a number of laboratory Diesel engine tests mentioned in the paper, but these will not be reproduced here. From where we sat, the report sounded favorable, and it was stated that additional work on synthetic base Diesel lubricants is currently being conducted. It is interesting to note that a small amount of detergent, added to the synthetic lubricant, was said to give improved results on the laboratory Diesel endurance test run of 480 hours.

There was a great deal of additional information presented on the new synthetic lubricants, such as, for example, viscosity-temperature relationships, in which the synthetic was claimed to have a high viscosity-index of 142. According to the SAE classification system, the lubricant mentioned in the foregoing tests (LB-300) would be equal to an SAE 20 oil. The engineers pointed out, however, that because of its high viscosity index, it is equal in viscosity to most SAE 10 oils at 0° F., and to most SAE 30 oils at 210° F. In other words, this one grade of synthetic lubricant is claimed to cover the range of the

(*Please turn to page* 154)



"Bring 'em all on... I can rebore 'em fast and right!"

...and YOU can say the same when you get a VAN NORMAN No. 777-S Per-fect-o Boring Bar with "Sucker-Outer"

You can handle the complete popular range of cars, trucks, and tractors with a 777-S that rebores cylinders from 2.6" to 5.343" diameter, and depths to 14". *And you can do more blocks* per day than you ever did before . . . because 777-S rebores each cylinder to factory-accuracy in one quick cut, every time. 4 "Cat's Paws" (exclusive feature) center the bar and support the cutter all the way, preventing weaving and vibration. One man can do the whole job with this heavy-duty, *portable* bar.

What's more, that man doesn't have to get under the motor . . . for the "Sucker-Outer" high-velocity vacuum unit (which is available at slight extra cost) sucks up chips from toolpoint, whisks them out into container, keeps them out of crank-case. "Sucker-Outer" is available for No. 777-S, 777-S-4, 944-S Per-Fect-O Bars. See your jobber today, or write Van Norman.

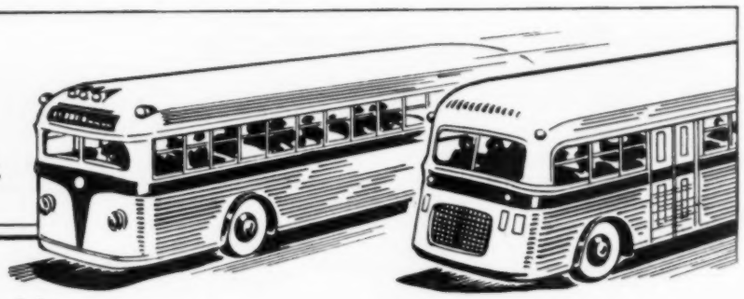
VAN NORMAN COMPANY
SPRINGFIELD 7, MASSACHUSETTS

Van Norman also builds the "HARD-SLEEVE BAR" No. 777-S-4

No more need to grind hard sleeves. 777-S-4 finishes them in 1 cut, in chassis or out. 4 speeds (75 to 375 rpm) for hardnesses up to 51 Rockwell C . . . 545 Brinnell, Scleroscope 75. Same capacity as 777-S (see above).

"It Pays to Van Normanize"
...and Precisionize Your Motor Overhauls

Keep Those Buses Running



BUSES are doing a bigger transportation job today than ever before . . . taxed to the limit by thousands who rely upon them as their only means of getting to and from their job.

It is absolutely necessary that buses be kept in good running order and compressed air plays an important role in their maintenance.

Ingersoll-Rand Automotive Air Compressors, designed for long life and dependable service, deliver needed air for any maintenance job.

This I-R line of compressors is complete. Contact our nearest service branch or your local I-R distributor for further details.

Sizes ½ to 10 hp
Pressures to 3500 lb
All types of mountings

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normal SAE 10, 20 and 30 grades of oils.

Low pour-point was another feature stressed, it being advanced that the low pour-point and the viscosity-temperature relationships insure adequate lubrication under high and low temperature conditions and permit the use of the synthetic lubricant in both summer and winter, rendering seasonal oil-changes unnecessary. It also goes without saying that the low pour-point facilitates easy low-temperature starting.

Film-strength claimed for the new lubricant was said to be intermediate between straight petroleum oils and mild extreme-pressure lubricants, when tested on three standard film-strength testing machines. Another claim is that the new lubricants may be compounded with additives to produce lubricants having EP properties, but that some EP additives currently used would not be suitable.

It was also interesting to learn that since the synthetic lubricant is chemically different from petroleum oils, many of the usual chemical tests applied to petroleum oils do not have the same significance. But as this is highly technical data, in which the average fleet man does not dabble, we will pass it by in this story. However, the measure of viscosity is, of course, as significant with synthetic oil as with petroleum oil, as it is a *physical* property.

Solvent action was another point discussed, it being claimed that in none of the field or laboratory tests conducted so far, has there been any indication of detrimental action due to dissolved oxidation products of petroleum oil, such as might reasonably be expected when using the synthetic lubricant's solvent action to "clean out" dirty engines. Regarding the release of a large amount of dirt, due to the synthetic lubricant's solvent action on gummy binders, it was theorized that the important point is whether the average particle size of this dirt has increased, and it was further claimed that the larger particles are not circulated in the synthetic lubricant, but that they settle to the bottom of the crankcase. In fact, the engineers declared that there was no evidence from laboratory or field tests that the solvent action of the synthetic lubricant was loosening deposits that might cause or aggravate clogging.

JOIN the Q-O-M CLUB

(See p. 120 and Mail Today)

It was revealed, however, that if petroleum oil should be added to a crankcase containing synthetic lubricant which contains a large amount of dissolved sludge and other oxidation products, a certain amount of the dissolved material may be precipitated; the more oil added, the greater amount of precipitation. Since the synthetic and petroleum lubricants are only partly soluble in each other, the engineers said that they do not consider it good practice to add mineral oil to the synthetic, except in emergencies, although mixtures of the two can be run in a clean engine without difficulty. In fact, they claimed, tests have been run in vehicles for 20,000 miles on a mixture of the two, with satisfactory results.

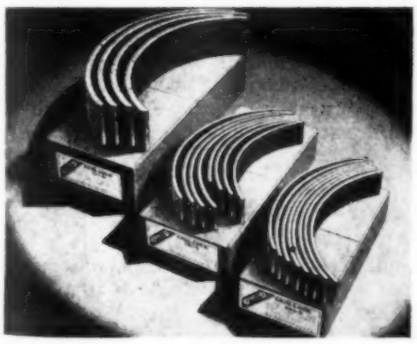
It was also pointed out that the synthetic lubricants will dissolve and hold in solution approximately 3% of water by weight, at room temperature, and if water in excess of this amount exists in the crankcase, it will appear as water globules. On standing, the water will form a lower layer if the temperature is above 50° F., or float on the oil if the temperature is below 50° F. One or two percent of water, it was claimed, will dissolve in the synthetic oil and will not freeze out of solution and interfere with oil

GRAFILD "PF" PRESCRIBED FRICTION SETS The correct friction requirements for each particular brake. Selected from highest quality materials, through laboratory and road tests. "Prescribed" or "Engineered for each type brake" to give correct braking performance, greater satisfaction and longer service. Instruction chart in each box contains directions for installation.

Grafild DeLuxe Woven—A super-quality, dense, high friction brake lining for passenger cars, trucks and industrial applications where greater holding power and maximum resistance to grit, water and oil are required.

Grafild Royal Grid Molded (Rolls) — A top quality molded lining designed for internal brakes. Responds to lighter pedal pressure without grab or excessive fading. Quiet and long-lived.

Grafild Grid Lock Molded—A moderately priced flexible wire back molded lining designed for average service in internal brakes. Non-scoring, positive and smooth in action.



Grafild Grid Lock Sets — Moderately priced, drilled, wire back sets for Ford, Chev., Plymouth and the popular General Motors and Chrysler cars.

Grafild Hetro Blocks — Type "Y" for all normal service; Type "D" for extreme heat conditions; Type "E" for high speed buses requiring quick stops.

• Send for descriptive catalog showing full details of the Grafild line with car, truck, bus and industrial equipment applications.

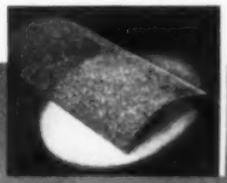
WORLD BESTOS CORP.

PATERSON • NEW JERSEY

AN OPPORTUNITY FOR PROFIT IN EVERY SET

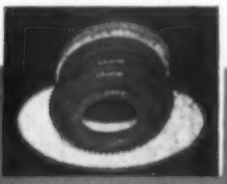
Grafild Truck Group Blocks — for thousands of models of trucks dating from 1933.

Grafild S. L. M. A. Sets — for all types and models of passenger cars and trucks.



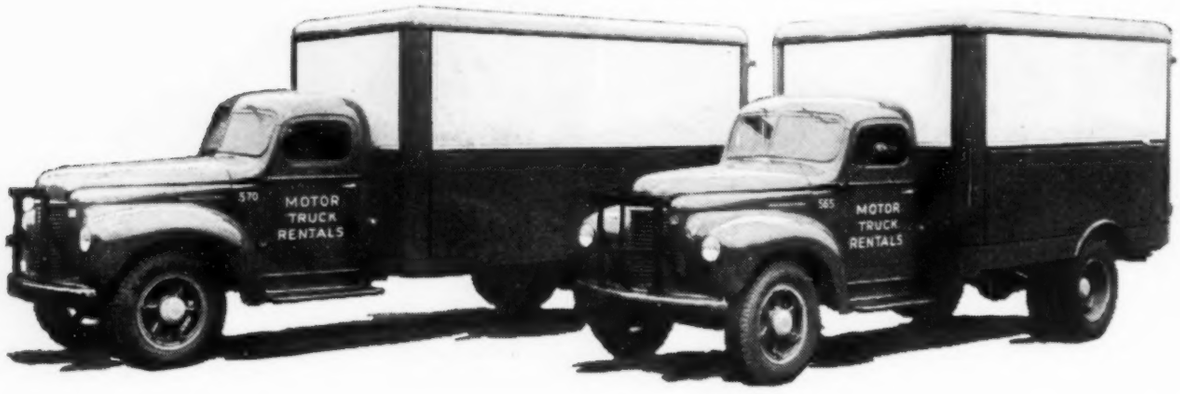
Grafild Molded Slabs — available in Hetro "Y" and in Hetro "E" — withstands high temperatures.

Grafild Woven Sheet Stock — the ideal way to stock heavy duty woven brake lining.



Grafild Clutch Facings — available in four types: ST Special, STM Special, Woven and Molded.

In the Truck Rental field—



"WHERE DEPENDABLE BRAKING COUNTS"

SCANDINAVIA BRAKE LININGS

DIVISION OF SCANDINAVIA BELTING COMPANY

250 CENTRAL AVENUE, NEWARK, NEW JERSEY — *Plant:* CHARLOTTE 1, N. C.

BOSTON • CLEVELAND • JOHN L. HALL CO., 625 N. W. COUCH STREET., PORTLAND 9, ORE.

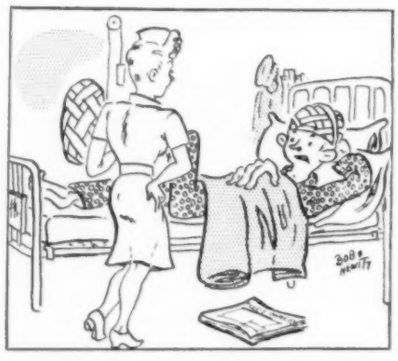
circulation, even at temperatures below the pour-point of the lubricant. It was also declared that while a water emulsion sludge can be formed in an engine with synthetic lubricant, the "mayonnaise" type of sludge is not formed.

Because of this water-carrying ability, it was admitted that the parts of a disassembled engine which has been operated on synthetic lubricant will rust quicker when exposed to high temperatures and high humidity conditions, than the parts of a similar engine operated on mineral oil for the same length of time, and that work is in progress to develop suitable additives to provide improved rust-preventive characteristics.

The use of filters was declared to be desirable when using synthetic oils and most of the commonly-used filters have been tested and found to function satisfactorily. Since the viscosity increase of the synthetic oils (due to use in engines) is claimed to be very low, this may have something to do with the good filter performance in removing solids.

Oil change recommendations for the synthetic lubricant could not be given any more accurately than in the case of petroleum oils, it was explained, as the proper oil-change period depends upon a number of factors. However, it was pointed out that with synthetic lubricants the oxidation products are for the most part volatile, which means that the lubricant remains essentially unchanged with use. Therefore no change of the synthetic would be necessary, except for the removal of road-dirt, metal particles, etc.

If the foregoing abstract of this extensive paper on synthetic lubricants sounds intriguing to you, it should be borne in mind that this was merely a presentation on the part of the sponsor of the product, frankly speaking. It is possible that advocates of petroleum lubricants, which have withstood the test of time—and which have undergone considerable improvements throughout the years—may also be conducting extensive tests with synthetic lubricants—this one as well as others of their own—and it is a bit early to draw any hasty conclusions that the synthetic is better than the natural, or vice versa. Undoubtedly many words will have been added to the chapter on this subject, before the final score is in. This publication has done its best to give you an unbiased resumé of the *first* paper to be presented on the subject. We have tried to strip it of superlatives and technical data—and to give you a simple report of what the SAE Members heard at Detroit last month on the subject of synthetic lubricants.



"Just before I came to the railroad crossing, I idled her down to a measly sixty."

•

"Wear Standards Are Needed"

(*Continued from page* 144)

and, if both are high, conclude that, per se, this vehicle should be the first to go.

Maintenance costs are also misleading, particularly these days. Work done by your senior mechanics on week-ends and holidays at double time-and-one-half, can build up maintenance costs in a hurry. And, when it comes to a determination of the remaining life in a worn part, exactly what do we know? What are our wear standards, and on what kind of an experience factor are they based?

Before the war, parts, repair labor, and new trucks themselves, were relatively cheap. This condition no longer obtains. The economic life of a vehicle depends on an attempt to coordinate the economic life of its component parts. Today, more than ever, it is important to extend the life of these parts as far as safety permits,

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from Thor

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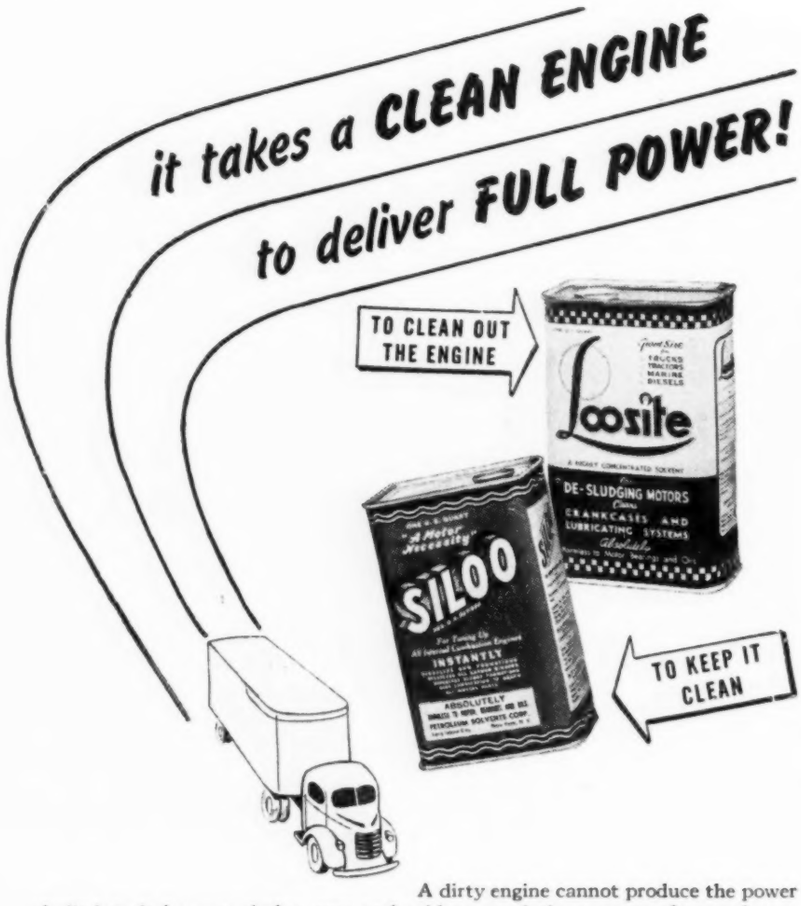

A dirty engine cannot produce the power built into it because sludge, gum and acid accumulations create abnormal conditions and "foul up" working parts.

LOOSITE, a basic cleaner, rids the engine of all sludge and gum. It reaches valves, rings and pistons; restores their real efficiency. It is safe, easy and economical to use.

After *one* **LOOSITE** treatment, a can of **SILOO** added with each change of crankcase oil, *keeps* your engine clean by dissolving immediately any *new* sludge formations. **SILOO**, the seven-solvent compound with four inhibitors, becomes an integral part of the lubricant itself—cannot be removed by any standard filter. This is important.

A **LOOSITE-SILOO** treatment will show immediate results on any make and model car—regardless of quality or brand of oil used. Fifteen years of service endorses its use.

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and to correctly evaluate their remaining life span, before deciding to retire the vehicle.

How do you obtain such actuarial tables? Some operators of large, concentrated, standardized fleets have been reasonably successful in developing their own maintenance standards. For the small, scattered or non-standardized fleet, compilation of such data is a physical impossibility.

The experience of the T & M Ordnance Vehicle Maintenance Committee on Wear Standards is an interesting case in point. By dint of much effort and educated guesswork, some information was finally furnished to the Ordnance Dept., and it seems to be working out rather well. But the surface of this subject has only been scratched.

We need much more help from the manufacturers in this direction. How can you hope to develop a proper yardstick for mechanical condition as a clue to retirement, when wear standard information generally is so sadly lacking? Until maintenance, repair and parts replacement more closely approaches an exact science, how can you acquire a fool-proof vehicle retirement program?

Why do our vehicles cost so much to repair? Why is depreciation so high? The answer lies in the fact that in the "art and science of engineering" as applied to vehicle maintenance, there is entirely too much art and not enough science. Proper Wear Standards present a real challenge to the S.A.E. T & M Activity.

•

"Vehicles Never Wear Out"

(*Continued from page* 75)

obsolescence, consideration should be given to changes in marketing and distribution policies, changes in labor policies, highway improvements, inability of the operator to obtain repair parts, and last but not least, technical advances made in the automotive and petroleum industries. Any one of these foregoing items could very easily give the operator sufficient justification for retiring a piece of equipment, whether it be old or relatively new.

In the past I have known at least one case where the re-construction of an old bridge gave the operator sufficient justification for the purchase of larger equipment and retiring the smaller.

Consolidation of operating points or growth in volume at an operating location will often be satisfied by installing larger units to replace a number of smaller units; in some cases, one large unit for two smaller ones. Retirement of equipment such as this can and is accomplished economically even though the equipment replaced may be of a rather late vintage with relatively few operating miles on the odometer. This method of retirement may be in direct opposition to the retirement formula, and it is brought into the picture not as a condemnation of retirement procedures and formulas, but simply to indicate some of the ramifications that exist on the subject matter.

We have, in our fleet, equipment that has accumulated in excess of a million miles of travel over a period of twelve years. On the other hand, there is other equipment in the fleet that has operated around 250,000 miles in two years' time. Equipment that has operated a million miles as of today is in just as safe operating condition as when it was placed on the road in 1933. This equipment was.

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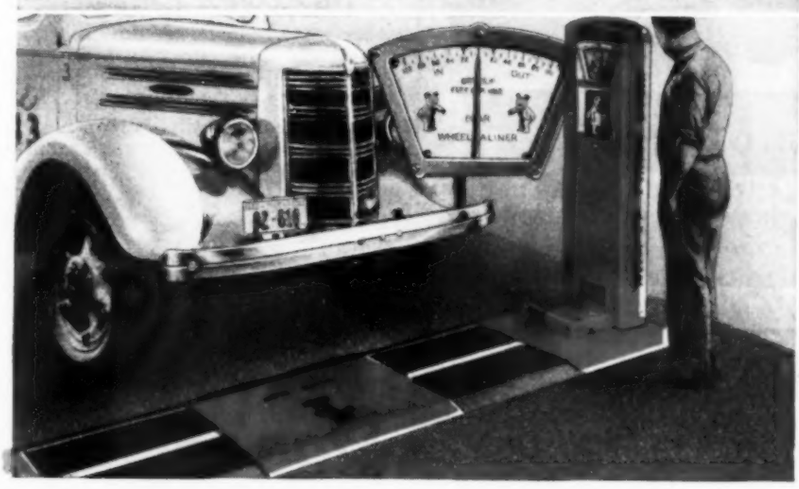
Two Quick Tests that will help you to

Lower Operating Costs!

Three out of four trucks are operating with out-of alinement wheels. Fleet operators are now feeling the pinch of high costs against ceiling prices. Unnecessary tire wear is adding needless costs to your budget. Read about these two simple tests and then write to Bear for more information.

❶ CHECK *Dy-Namic WHEEL BALANCE* with BEAR SHIMMY DETECTOR

Shows Dy-Namic UNbalance in a Jiffy! Simply jack up the truck, shove Bear Shimmy Detector under wheel, and "rev" her up to about 35. That front end and whole body vibrating and shimmying shows how UNbalanced wheels pound the life out of tires and steering parts. Then after wheel has been Dy-Namically Balanced, use Bear Shimmy Detector as a check. If vibration is absent, work has been done right.



❷ CHECK *WHEEL ALINEMENT* with BEAR ALINEMENT Tester

Takes half-a-minute. Just drive truck over platform—Read Dial—That's All! Easy-to-read figures indicate front and rear wheel misalinement, and side-slip or drag per mile; even shows up bent rear-axle housing. Proves wheels are out of-alinement, wasting tires, wasting parts—risking life. Enables you to make quick, correct toe-in adjustments on all cars and trucks.

Send questions to BEAR MFG. CO., Dept. F.O., Rock Island, Ill.

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MODEL R204 UNIVERSAL RESEATER SET

REPAIR TODAY THE K-O WAY!

SEE YOUR "K-O" JOBBER OR WRITE TO
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Manufacturers of Fine Tools for Over Thirty Years

of course, put on preventive maintenance since it was first placed on the highway; and the only real justification in retiring this equipment off the highway at the moment, is the availability of lighter and faster equipment that would permit more ton-miles per hour. Of course, as mentioned earlier, the procuring of parts which in some cases become impossible to obtain for the older units in question, can force the vehicles into retirement.

The equipment that has accumulated but 250,000 miles within two years is likewise in excellent operating condition as it also has been on preventive maintenance from the start. However, in the case of this 250,000-mile, rather young equipment, which was purchased to operate under a state gross vehicle load limitation of 39,000 pounds, we have at present an excellent justification for replacement. This justification lies in the fact that, during the past year, the state in which this equipment operates changed their weight laws from 39,000 to 45,000 pounds for a tractor-semi-trailer unit. Such additional permissible weight loading, translated into a correspondingly increased payload, definitely justifies the retirement of this equipment; and this holds true for equipment that may be even newer than the equipment under consideration.

We often hear the expression used, "The equipment is worn-out and should, therefore, be replaced". It is rather difficult to reconcile a "worn-out" piece of equipment in the light of an effective preventive maintenance program. Admittedly, there is often the tendency to keep equipment in operation by running repairs alone; i.e., repairs are made only at such times as trouble occurs. Then when the body or cab reach a point where the equipment is no longer presentable, when the gears become noisy, and you can literally spin the steering wheel before it takes hold, it is considered worn-out and time to retire it.

However, long before this point, the equipment has ceased to be safe on the highway. Where the point of "worn-out" is, we do not know, for even on our million-mile equipment, we have changed assemblies such as engines and other units many times due to normal wear, but the truck, as mentioned before, is in as safe operating condition as in 1933, and cannot, therefore, be classed as worn-out.

In conclusion, mention was made in advancement in technical design as a factor to be considered in vehicle retirement. Along this line, the improvements may be reflected in lower maintenance costs or increased fuel mileage to such a degree that replacement of the vehicle becomes quite obvious in the light of estimated dollar savings. For example, fuel and maintenance costs in many operations are the major yearly expenditures, and an increase of ten to twenty per cent in fuel mileage for high yearly-mileage units can very easily justify the replacement of the vehicle for another more economical unit. Likewise, a unit that will effect an appreciable reduction in maintenance expenses, resulting from better design and maintenance accessibility, can also retire the more expensive maintained unit regardless of the age of the latter.

Essentially then, the above discussion reflects the policy pursued by my own company in its approach to the retirement problem, and any or all of the factors mentioned exert their influence on the final decision.

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Gatke CUSTOM-BILT **BRAKE LININGS**
BLOCKS SETS ROLLS SHEETS
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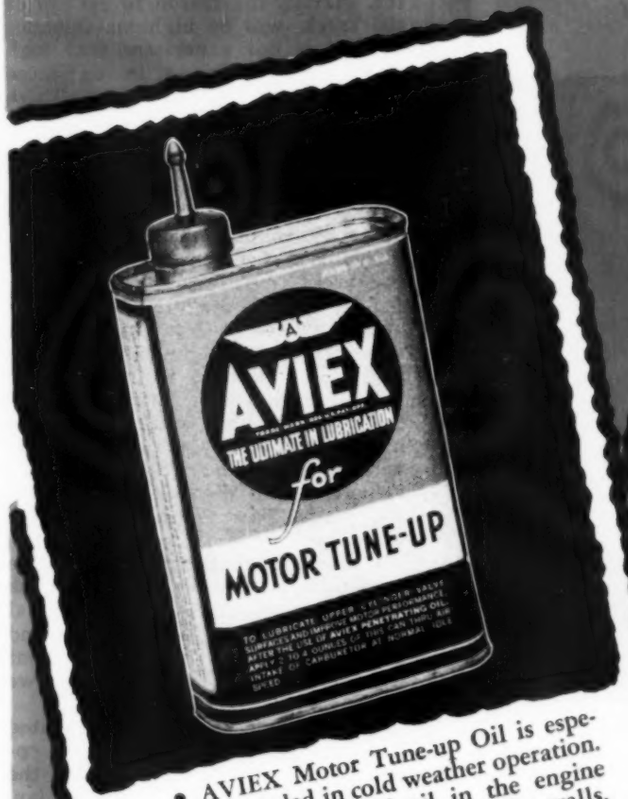
3 GREAT PRODUCTS
for Every Fleet Operator



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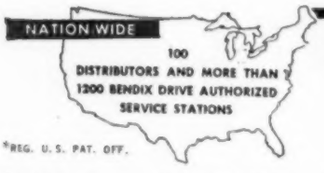
Little Known facts of a well-known product

The wide usage of Bendix* Starter Drive in over 65 million installations is due in no small degree to the excellence of design and workmanship of each of its component parts.

That vital part, the Anti-Drift Spring, for example—made of the finest quality wire—holds the starter pinion away from the flywheel when not in use and thus prevents unintended meshing.

For quick identification and your protection, the Anti-Drift Spring and other Bendix Starter Drive parts are packed in the well-known blue and white Bendix boxes.

Remember—the name Bendix is your assurance of durable construction and customer satisfaction.



*REG. U. S. PAT. OFF.

Bendix Drive

Bendix AVIATION CORPORATION

ECLIPSE MACHINE DIVISION, ELMIRA, NEW YORK

"Depreciation Methods Vary"

(*Continued from page 75*)

wants to get his money back, then sets up the depreciation at this rate. . . . The big problem, however, is how long should you run this truck? When should it be replaced? How soon should you get your investment back and buy a new truck?

There are two schools of thought on this subject as illustrated by Oliver Wendell Holmes and the Canadian Wood-Chopper. In writing the "*Wonderful One-Hoss Shay*", Oliver Wendell Holmes referred to the old wagon as one which the deacon would build to beat the town, and tells how it went to pieces all at once—just as a bubble does when it bursts. . . . This job, you see, had very low depreciation, no high-cost maintenance and no trade-in problem. How wonderful it would be if we had trucks like that!

On the other hand, a French-Canadian lumberjack expressed the poorest depreciation policy I ever heard of. "By Gar", he said, "This is one beautiful axe—she is the best one I ever have—she never wear out. In the last two season I only have to buy three handle and two head." During the past few years this is exactly what we have been doing to our trucks. . . . The compromise we have to make is somewhere as close to Mr. Holmes as possible, without getting into the same trouble as our lumberjack friend.

Let's start with some small vehicles. If these are to be used around a city like Chicago for laundry work, etc. we estimate that the controlling factor, that is, the reason to get rid of the truck, will be high maintenance cost. It is our experience that high maintenance will set in on these vehicles after 80,000 miles. These trucks run about 50 miles per day or 300 miles per week, or 15,600 miles per year. Thus, supposing the original cost to be $1,000.00 without tires, and the residual value to be $100.00 without tires, we have $900.00 to be depreciated in five years, which is $3.46 per week.

Let us suppose that this same vehicle will be used at the rate of 75 miles per day, then it will have to be depreciated sooner. Three and one-half years would be about right and the residual value would be a little higher. Assuming the same $1,000.00 without tires and $175.00 residual value, we thus depreciate $825.00 in 3½ years. This gives us $4.54 per week.

I imagine that just about here somebody is getting ready to ask some questions about these residual values. Well, they naturally depend on a market which is fluctuating, but we simply estimate them the best we can.

Next, let us take a more complicated problem. Say, that a tractor is operating two shifts with a trailer, the combination going 250 miles per day. On some vehicles in this work, we estimate 250,000 miles as the useful life of the tractor before the maintenance becomes prohibitive, and five years for the trailer with no reference to mileage on this unit. Thus, we would depreciate the tractor in 3⅓ years and the trailer in 5 years, with a cost for tractor of $4,500.00 plus tires and a residual value of $350.00. The tractor would then be $23.99 per week. If we assume the cost of the trailer at $3,000.00 plus tires, the depreciation would be $15.40 per week. This gives us a total for the combination unit of $39.39 per

AUTOPULSE
ELECTRIC FUEL PUMP

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- Greater Economy
- No Vapor Lock
- Added Protection

AUTOPULSE CORP., DETROIT

Rayon's amazing record of fighting off heat and wear in truck tires is well known to all truckers. Now *Fisk* introduces to tires of 8 ply rating and larger a sensational new development in truck tire construction — DOUBLE RAYON.

Twice as heavy, twice as husky, each cord of *Fisk* DOUBLE RAYON is far stronger than ordinary rayon tire cord. Now 8 plies do the work of 10 . . . and do it better. With this new construction, service interruptions are stymied at their source, maintenance costs are cut to the bone. Because of more rubber-to-rubber contact, plies and tread hold together tenaciously to guard against separations. For longer tire life, from the original tread to the last recap, make your next tires *Fisk* — the tire with DOUBLE RAYON. Fisk Tire Company, Division of United States Rubber Company.

FISK TRUCK TIRES

SOUTH BEND PRECISION LATHES

Here is essential service equipment that can quickly pay for itself in your shop. With it you can re-machine worn or broken parts that have been repaired or built up by welding or metal spraying, refinish valves and commutators, finish pistons, make bearings and bushings, machine shafts, sharpen reamers and cutters, and rework and fit parts.

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A South Bend Lathe can save its cost by PREVENTING costly breakdowns — by saving days of delay — by keeping cars and trucks on the road. Write today for free catalog.

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week. The highest mileage we use in depreciation is 400,000 on some special vehicles. Due to wartime lack of replacements we have run a number of vehicles considerably in excess of this figure, and, from a maintenance standpoint, we are very sorry for it.

Let us now consider the short-mileage vehicles, such as a truck running a many-stop, short route, such as a milk truck. At 20 miles per day, 7 days per week, this truck would go only about 7,300 miles per year. Obviously, this truck isn't going to wear out due to mileage. In ten years it would only go 73,000 miles. We would use 6½ years depreciation on this. Assuming that the vehicle cost $1,000.00 without tires and had a $50.00 residual value, the depreciation would be $2.84 per week.

A summary of the above cases shows how widely varied are the methods of depreciation. . . . On a panel truck we:

(a) Depreciated two vehicles at 80,000 miles; one in 3½ years and one in 5 years. One at $3.46 per week and one at $4.54.

(b) On our milk truck we throw the mileage factor out and simply say 6½ years is the depreciation time. This shows $2.84 per week.

(c) On another vehicle we use 250,000 miles, as contrasted with 80,000 miles, and do not use a mileage factor on the trailer. This shows $39.39 per week.

Our only conclusion is that each job must be treated separately. Our depreciation factors are all estimates, but we must have the best thought of the treasurer, the operating department and the maintenance department on each job, to make these estimates.

•

Sanders Speed-Up Schedules

(*Continued from page* 98)

tion. Boots of rubber, specially designed to prevent freezing and clogging, deliver the sand to the road from the containers. The operating units are electrically controlled by a switch, immediately in front of the driver on the instrument panel of the truck.

This switch opens the valves and allows the sand to flow in an even stream under each of the drive-wheels, establishing a firm, gritty track on the highway. Further, the track of sand will remain on the highway and can be used by other truck drivers and motorists who follow. Drivers of our trucks, in fact, have reported numerous instances where lines of cars have waited for them to pass, in order to take advantage of this safety-trail of sand.

•

How Should We Rate Brakes?

(*Continued from page* 96)

currently in use that have more than two shoes and which have a lining coverage approximating the entire braking surface of the brake drum. The mechanics of the design of these brakes insure the economical use of the lining material and the throw-away portion is a minimum. Further, the lining has not been added with any idea of securing an unwarranted advantage. These brakes stand out in the tabulation of lining areas as, size for size, they have almost 50 per cent greater lining area. In the application of the load area factors previously mentioned, these brakes have 50 per cent greater capacity than conventional two-shoe designs.

These brakes emphasize the extreme

There's a GOOD REASON

for Bowers GREAT RECORD

● No battery manufacturer can point to a more impressive and convincing record-of-growth in the bus and truck field than Bowers! Here's a name that has gained a high position of recognition in a remarkably short length of time. Bowers has shown the greatest advance in position in recent years. The reason is this—we've merely asked fleet operators to "try it—check it—compare it." And the men who check the mileage; watch the costs; replace the batteries—those are the men who KNOW they are actually getting as much as *50% more service* from this rugged battery that's built for heavy duty hauling. But don't take *our* word for it! And don't take *their* word for it! FIND OUT FOR YOURSELF. Put in some Bowers Batteries and really give-them-the-works. You'll switch to Bowers and you'll stick to Bowers for longer, more dependable, more economical battery performance!

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A Dillectric repair fills, reinforces, vulcanizes the tube injury completely safe. No guesswork—no failures.

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Dillectric makes a smooth feather-edge repair every time. So neat it looks like and is a perfect job of workmanship.

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Every Dillectric Clamp carries the seal of approval of the Underwriters' Laboratories. Safe for gasoline stations.

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Time and temperature of vulcanization is controlled by automatic shut-off. No guessing—no watching. Perfectly vulcanized repairs every time.

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All Dillectric Patch and Valve Stem Units come ready-prepared. No waste — quick to use — easy to inventory.

FASTER

It takes only a few minutes to complete a repair. Dillectric works in the quickest possible time for perfect vulcanization.

COMPLETE
Handles Everything

Round and oval patches, valve stems, heavy duty truck patches—all types of repairs in all tubes — synthetic or natural rubber.

LOW COST MONEY-MAKER

Dillectric Patch Units cost less than 4c each. Yet, Dillectric repairs usually sell for 50c or more.

ATTRACTS MORE CUSTOMERS

Car owners know electric vulcanizing is best. Your Dillectric Outfit shows them you make safe, modern repairs.

OVER 75,000 STATIONS USE IT

Dillectric is No. 1 in tube repair service—the handiest, quickest way to safely repair all type tubes—used by over 75,000 service stations.

RECOMMENDED
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Dillectric is universally approved and recommended. Your tire company, oil company, or jobber can supply you.

DILLECTRIC
Electrically VULCANIZED TUBE REPAIRS

Instruction Manual FREE—Pictures and describes the proper preparation of synthetic tube injuries for safe, permanent vulcanization.

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variations in capacity which are possibly using the load-area method of rating brakes. The capacity differences show a disregard for the basic principle of the utilization of a friction device for converting the energy of motion into heat energy. The brakes as used on commercial vehicle axles are such a device and the heat energy generated during the braking action must be dissipated. In most cases the air in contact with the brake drum is the medium for carrying off the heat and assuming that this area is a function of the diameter and width of the brake, it is axiomatic that all brakes of the same size have the same capacity.

It is on this principle of the brake as an energy-converting unit, that so-called "work formulas" for rating brakes have been evolved. Such a formula would include an expression indicating the energy to be absorbed and also one showing the size and effectiveness of the brake. The "work factor" would have to be interpreted on the basis of experience with the type and severity of the service to which the brake is subjected. A formula of this type which has been in use for many years with very good results is known in the trade as the Timken Work Formula. It is briefly as follows:

Work Energy—Weight on Wheels (lbs.) x Rolling Radius of the Tire (In.)

Brake Capacity—Brake Width (In.) x Brake Diameter (In.) x Effectiveness (Brake Dia.)

or

$$\text{Work Factor} = \text{w.f.} = \frac{W \times R}{D^2 \times W}$$

A work factor (w.f.) of 110-115 has been found satisfactory for trucks. A work factor of 80-85 has been successful for busses. Approximately the same differential exists between these factors as prevailed between the load-area factors of 40 and 25, used under the original methods of load-area and pressure-area rating. The above work formula can be criticized from many angles, but the fact remains that it contains the essential expressions for work and capacity and that it is simple, useful and proven. It will be noted that no lining area factor is introduced, but merely the diameter and width of brake.

A further consideration of the results of brake operation in actual service will indicate that the analysis of brake equipment based on the heat capacity of the unit is the most logical. For instance, the ability of a brake drum to dissipate heat is increased by either permitting more drum area to come in contact with the surrounding air, or causing more air to circulate over the drum surface. The former is accomplished by adding cooling ribs to the brake drum, while the latter is obtained by coring ventilating holes in the brake drum dish. Adequate clearance between the tire rim and outer periphery of the brake drum is also helpful. In heavy-duty brake service, in recent years, practically all wheel brakes are designed so that the shoes are mounted on open-type spiders. No dust shields or covers are necessary with this construction and as a consequence, air can circulate into the inside of the brake drum. This is particularly beneficial in hot summer weather. Operators can provide testimonials regarding the improvement in brake mileage and performance, due to the use of ventilated drums and open type brakes.

JM USE JM
Johns-Manville brake linings
Fleet-Tested Sets | Brake Blocks | Clutch Facings

Inside an engine, Pedrick Rings GUARANTEE oil economy

THE PEDRICK GUARANTEE is no empty phrase. To every authorized shop, it means money back, quickly, if any Pedrick Engineered Set of piston rings does not stop excessive oil consumption.

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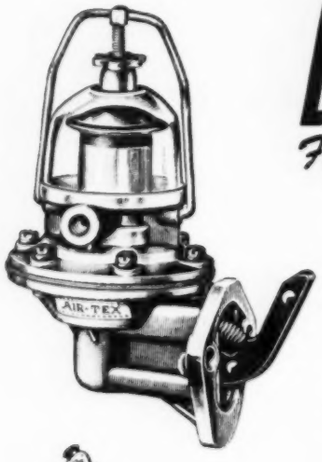

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The object in introducing these facts at this point is that they indicate a feature of brake design which is extremely important and which can best be illustrated as follows:

Test figures show average temperatures for a brake drum under severe service conditions to be 400 degrees on the outside of the brake ring for a comparable temperature of 1100 degrees on the inside braking surface. The surrounding air temperature generally averages 100 degrees. Generalizing somewhat, it is reasonable to say that the heat-dissipating capacity of the outside of the brake drum approximates the product of the circumference of the drum, the width of brake, a combined heat dissipation constant and the differential in temperature between the drum surface and outside air. Results from the field justify the assumption that the inside area of the brake drum can also contribute to the total heat-dissipating capacity of the brake drum.

Combining the exposed inside and outside surfaces, the total heat-dissipating capacity of the brake drum can thus be doubled by removing one-third of the lining and exposing the braking surface. The high temperature of the inside surface provides the differential with the circulating air. Such heat as is lost from this surface need not be carried through the drum. This is *not* a theoretical analysis which has no factual basis in actual vehicle operation. The results obtained in the field have also been checked in the laboratory. The following will elaborate on this point:

In a recent laboratory test, a conventional two-shoe hinged anchor, heavy-duty bus brake was installed on the dynamometer. The brake was subjected to a series of stops simulating transit bus service. The torque output of the brake was held constant, to secure a retarding rate equivalent to 10 feet per second. The cam torque input was varied to obtain this figure. The object of this test was to determine the effect on the performance of the brake of decreasing the length of the brake liners on the two brake shoes. The original shoes had liners 116 degrees long. Duplicate tests of 500 stops each were made on each set of liners, which were reduced in length by removing 5 degrees of arc length of the liner from both the cam and anchor end. The changes in length in 10-degree increments per shoe were continued until only 56 degrees of liner material was left on each shoe. Observations of drum temperatures and operating pressures were made and recorded during the test and the thickness of the liner was measured at the conclusion of 500 stops.

The results of this test are shown on Plate VI in the form of curves. It is important to note that with the decrease in liner length the drum temperature decreased, with the resultant reduction in the rate of liner wear. Also, it is interesting to note that the air pressure required to make the stop shows a decrease. This indicates that the brake is more effective. The curves reach a minimum point at 96 degrees of liner length per shoe, after which an increase in the various factors is evident.

This is only one of a number of tests and observations which substantiate the premise that the brake is an energy-converting unit and that its capacity is dependent on its ability to dissipate the heat energy into the surrounding air. It further indicates that a properly ventilated brake can

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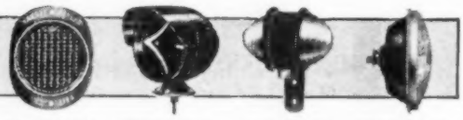

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be penalized by having too much lining coverage on the drum braking surface.

Several designs of brakes in current use utilize these principles of maximum air circulation and maximum exposure of the drum braking surface. Two of these are propeller shaft brakes, one a drum type and the other a disc type. A disc design of brake with minimum drum coverage is also used for high-speed train braking and an aircraft wheel brake is quite radical in the utilization of this fundamental. Several small discs of lining constitute the friction material on this brake.

Summarizing the points thus far presented, two methods of rating brakes on the basis of lining areas are in current usage; first, capacity based on "pounds g.v.w. per square inch of lining" and second, "pounds of brake applying force per square inch of lining area". An analysis has been offered to indicate the greater accuracy of using the *projected* area of the lining rather than the arcuate area.

The rating of brakes based on a "capacity or work factor" has also been presented along with the facts relating to the effect of drum radiating surface on the capacity of the brake. Where this method has been used and the factors properly interpreted, it has given the best results of any of the rating methods. It does not tend to encourage the use of an excessive area of brake liner, and correction factors can be introduced to compensate for features of design, which have been found in actual service to influence the capacity of the brake.

The one factor which is not prevalent in any of the formulas is that indicating the influence of the horsepower of the engine in the vehicle on the brake requirements. The work that the brakes must perform is dependent in many cases on the ability of the engine to accelerate the vehicle. This is particularly true of transit-type coaches. In this type of service, the brake requirements are almost directly proportional to the engine horsepower. For other types of vehicles the top speed is the influencing factor in brake design. This top speed also has a horsepower requirement. The manner in which a correction factor for horsepower can be introduced into the methods of rating brakes discussed so far has not been established at this time.

Much work has been done with the object of including engine horsepower or potential vehicle horsepower in the analysis of the brakes. In this approach to the problem of establishing brake capacity, the automotive brake is also assumed to be an energy-converting unit from which it is necessary to dissipate the heat energy to the surrounding air. The brake drum surface or area serves as the basis for this analysis. The rating factor is the kinetic energy absorption per square inch of brake drum "swept area". This "swept area" is the product of the inside periphery of the brake drum and the width of the brake shoe. On aircraft brakes a kinetic energy of 12,000 to 15,000 foot-pounds of energy per square inch of drum surface is used. The application of these factors to automotive brakes is not quite as simple, for the following reasons:

In the aviation field, the maximum braking speed and rate of deceleration can be established approximately from the specifications of the plane. Typical figures are 100 m.p.h. and 10

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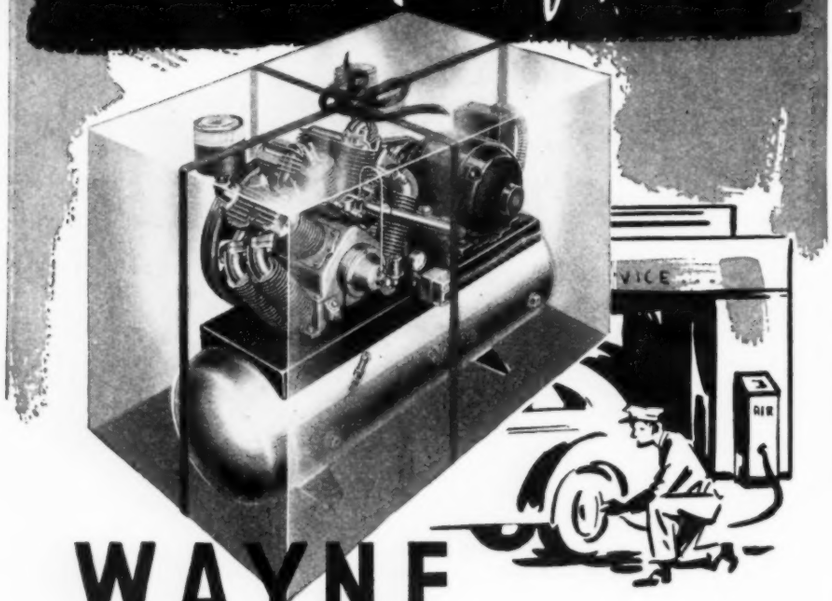

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feet per second per second deceleration and the kinetic energy of the ship can readily be established.

In bus and truck service, it is somewhat more involved to establish the kinetic energy, due to the varied types of brake service. For instance, there is the continuous brake service in descending grades, as compared with frequent intermittent stops in city type service. Variable top speeds and average speeds are involved and of particular importance is the length of time during which the energy is absorbed by the brake drum. The procedure is not satisfactorily developed as yet by which the braking energy can be set up on a time basis, so that all types of brake service can be assigned a rating constant. The continuous energy-absorption in a uniform downhill braking operation is much simpler to analyze than intermittent type brake service.

Laboratory tests have already established a figure of 1200 foot-pounds of kinetic energy per square inch of drum "swept area" per second as a "rate" which will minimize drum heat-checking and insure brake operating temperatures within the stable operating range for friction materials.

This method of rating brakes was presented in some detail by J. George Oetzel in a paper before the S.A.E. It includes the element of time of brake application and possesses possibilities as a means of translating engine horsepower or potential braking horsepower into a direct function in the formulation for establishing brake capacity. At the present time, the values have not been adequately investigated or considered, outside of the laboratory, so that this method of rating brakes is not ready for general usage. It is, however, one that has many possibilities for future analysis of vehicle brake capacities.

As originally stated, the purpose of this paper was to review the various methods which are the basis for rating commercial vehicle brakes at the present time. Other methods than these discussed are used in analyzing braking on other types of equipment, such as clutches for well-drilling rigs, shovels and drag-lines. All of these are important, as they indicate the complete problem in setting up formulation. The most urgent need, however, is for an understanding of the principles of rating brakes in their application to automotive vehicles. It is believed that the best results will be obtained at the present time with the following methods of rating:

1. Where pressure-area or vehicle load-area factors are used as a basis for rating brakes, the *projected* area of the liner should be used.
2. The "work factor" basis for rating brakes conforms more closely to the theory of utilizing the brakes as energy-converting units. This rating method gives a better interpretation of the various designs than other methods in use. It also emphasizes the value of additional radiating capacity in the brake design.
3. With any of the methods of rating, the adequacy of the brakes for each axle should be determined on the basis of load on the axle at the ground.

In conclusion, it is urged that serious consideration be given to the evolution of a universal method of rating brakes. Such a method for determining the adequacy of brakes must consider the units from an energy-converting hypothesis, with factors introduced to allowed for engine horsepower and type of operation.

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Improving Driver's Comfort

(*Continued from page* 100)

possible to produce a seat that should be comfortable to the driver at this cost.

Let's analyze a little bit what other industries have done for seating. The railroads think nothing of spending $60, $70 or $80 for a seat for a vehicle that is running on smooth railroad tracks. The airplane and bus industries think nothing of spending the necessary money for the comfort of the occupant, and when it is considered, I know of no seat that is subjected to more wear-and-tear and abuse than a truck seat, and at the same time, in the past, it has had to be produced at a cost that made it impossible to be comfortable. Furniture manufacturers think nothing of putting $20 to $25 cost into a seat, and when you consider that it is subjected only to static loading, compared to what the poor truck driver's seat goes through, you can readily see that something must be done to give the truck driver more comfort.

There are several methods of suspending unit seats that will give a definitely comfortable ride. The types that I have had the best results with are the types that are unit seats, wherein the seat cushion and the back move in unison with the body, and are suspended either with small shock-absorbing elements or on rubber, and with proper construction of the seat and back proper.

(6) Another item I would like to bring up in cab construction and suspension is that I have seen so many times that the cab is mounted on a three-point suspension to become flexible, as it should be, to meet the rough terrain, and then the steering-gear assembly that is rigidly fixed to the main frame. The column of the gear is then rigidly supported to the flexing cab and subjected to an effective breakdown test of the steering-gear. I feel that the steering-column in most cases should be rigidly supported on the same main frame as the steering-gear is mounted on, free from the cab action.

(7) In the matter of ventilation, I think there is very much need for defrosting methods on the side windows of the cab, and also the need for no-draft ventilation on the side windows.

(8) Some of us who have driven trucks at long intervals will readily appreciate the necessity of proper door closures by rubber seals and proper fitting doors.

(9) Another item that I feel has been completely overlooked in most trucks is the uneven balance of the brake and clutch pedal pressures that the driver must operate. I have seen instances where brake pedal pressures were approximately 15 lbs. and clutch pressures 80 or 90 lbs. This condition can be corrected today, so that the pressures are somewhat equal, and you would be surprised at the effect it has on the driver who is starting and stopping, especially the bus operators.

(10) Another important step to be taken, especially for the driver who operates within the cities proper and does a lot of starting and stopping and curbing of his vehicle for deliveries, is an effective power steering mechanism, to facilitate parking and handling.

In summarizing the suggestions and remarks I have made, I would like to emphasize the importance of driver comfort and driver satisfaction, because no manufacturer could ever hire a better salesman than an enthusiastic and satisfied driver.

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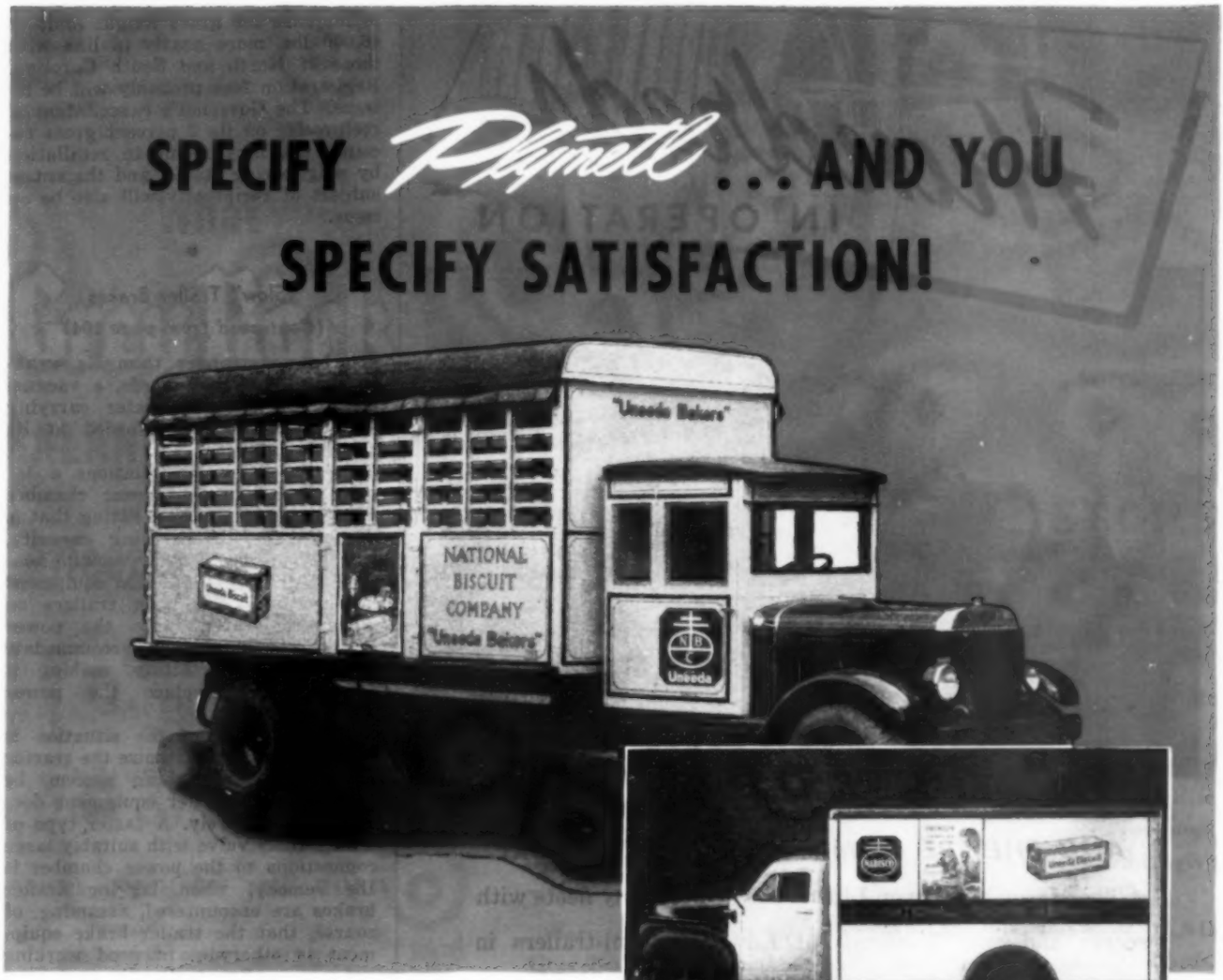

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EDWARDS IRON WORKS, INC., SOUTH BEND, INDIANA

EDWARDS SEMI-TRAILERS

Legislative Outlook

(*Continued from page* 102)

ment Association has considered the possibility of assessing tolls on all motor vehicles entering Atlantic City. A 1¢ gas tax increase is likely to be proposed.

New York—For several years, attempts have been made to change the registration date to April 1. Such a measure was passed by the 1945 legislature, but was vetoed. Compulsory inspection of motor vehicles has been under consideration for several years and likely will be introduced in 1946. A perennial favorite New York proposal is the requirement that all trucks and trailers be equipped with rear bumpers of the same heights as those of passenger-cars. Thus far it has failed to receive serious consideration but probably will again make its appearance in 1946.

South Carolina—Proposals have been made for several years for taxation of trucks delivering goods in cities in which they do not have a regularly-established place of business. This might take the form of a state tax on such trucks or permit the various municipalities to levy such taxes. Such a move may be proposed in the next session.

Virginia—Attempts may be made to increase the gross weight limit of 40,000 lbs. more nearly in line with those of North and South Carolina. Registration fees probably will be an issue. The Governor's cancellation of reciprocity on its 2 percent gross receipts tax may result in retaliation by neighboring states, and the entire subject of reciprocity will also be an issue.

●

"Slow" Trailer Brakes

(*Continued from page* 104)

can be no stronger than its weakest link. In other words, a vacuum line can have no greater carrying capacity than that afforded at its smallest diameter.

On the larger installations a ¾" pipe thread in the power chamber will allow using a hose fitting that is adequate in air carrying capacity, when 1" inside diameter vacuum hose is used. It is reported that equipment is sometimes found on trailers on which the thread into the power chamber is too small to accommodate a large enough fitting, making it necessary to replace the power chambers.

The summary of the situation is this: When you modernize the tractor vacuum power braking system, be sure that the trailer equipment does not lag excessively. A faster type of trailer relay valve with suitably large connections to the power chamber is the remedy, when lagging trailer brakes are encountered, assuming, of course, that the trailer brake equipment is otherwise in good working order, according to Bendix engineers, who sponsor the advice given in this article.

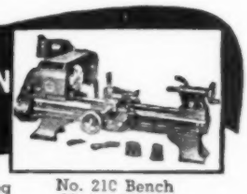
●

Linn's New Delivery Job

(*Continued from page* 108)

percentage of the full power developed, to the front driving axle. The hand-brake is also mounted on this sub-assembly, as shown. Thus the power goes from engine, through clutch and transmission, to transfer-case and then down to propeller-shaft,

for PRECISION REPAIR WORK



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SAFER STOPS

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AND SATISFACTION

MORE TIME ON THE ROAD

FASTER SCHEDULES

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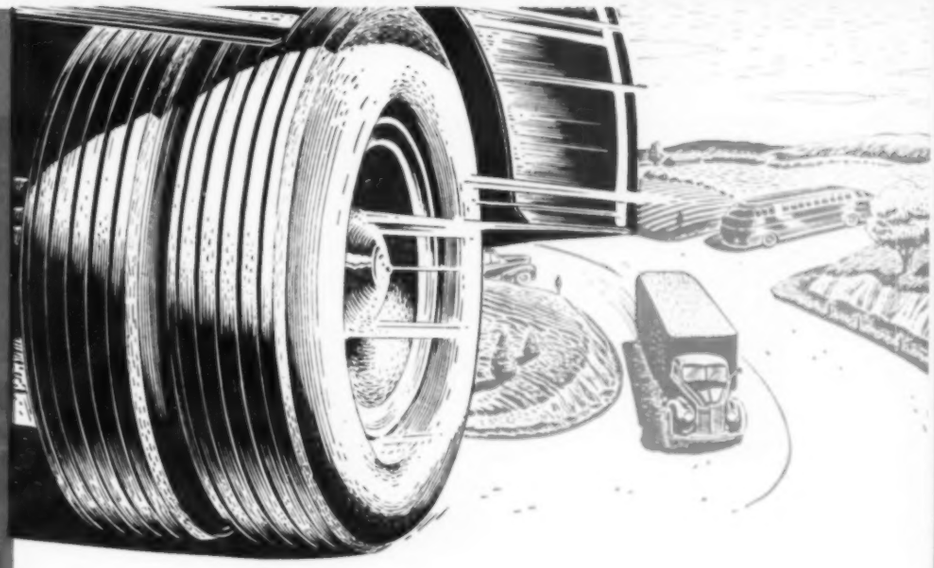

✓ SMOOTHER, SAFER STOPS

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That's a big reason why Grey-Rock Balanced Linings and Blocks mean so much to fleet operators!

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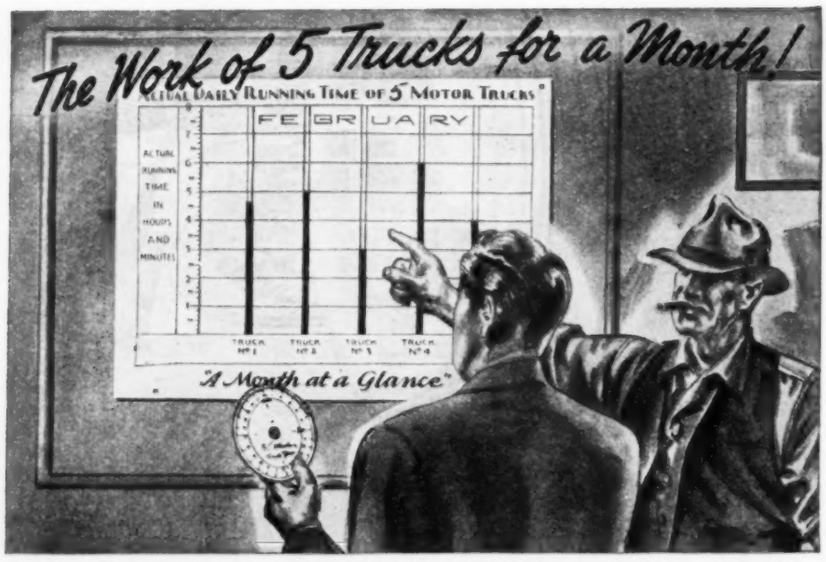
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TRUCK No. 2
TRUCK No. 3
TRUCK No. 4
"A Month at a Glance"

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● How much of the day is each truck *actually running?* The answer to that is the real key to efficient truck management. Suppose you are operating five trucks, for instance, and you always thought Joe on No. 5 and Emil on No. 2 were equally hard working drivers, wouldn't it startle you to find that No. 5 was running *3 hours* less per day than No. 2!

Well, just make a graphic picture of their comparative running time for a month, obtained from the charts produced by the *Servis Recorder.* That Wall Chart compares the work of the whole fleet at a glance. Then you'll know where to correct abuses such as idleness, avoidable delays, faulty routing, unnecessary overtime, speeding, etc. Write for our SKY-LINE Chart and full information. THE SERVICE RECORDER CO., 1375 Euclid Avenue, Cleveland 15, Ohio.

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universal joints and forward to the driving axle.

The front driving axle is also described as a "standard" job, such as those used on four-wheel-drive vehicles, and is positioned with the conventional springs and spring hangers. Hydraulic brakes are standard on all four wheels. The power assembly is attached to the body frame in such a manner that easy removal for servicing is possible, and also at a height to permit a 16-inch body floor level, from the ground.

In announcing this new delivery coach, the maker presents an interesting comparison. For example, in stacking this up against a conventional 1½-ton truck of 154-inch wheelbase, the new unit is 3'4" shorter in overall length and gives one foot more of payload space in length—with a wheelbase of 138 inches. Thus, he points out, there is a saving of 16 inches in wheelbase, which obviously gives a smaller turning radius. The saving of 3'4" in overall length, of course, makes it easy to park the new vehicle in tight places.

The manufacturer also makes a weight comparison. The conventional truck, he says, weighs 6,545 pounds, while the Linn (with 14-foot body) weighs 5,010 pounds—a saving of over 1,500 pounds, which perhaps can be used for extra payload. It is also claimed that in the new Linn delivery coach, the loading ratio is evenly divided among all four wheels, instead of carrying most of the load directly over the rear axle.

Other body dimensions are as follows: Inside body length, from front end of front door to rear of body, 13'8". Inside body width, 80 inches. The rear doors shown in one of the pictures give a 43 inches wide clear door opening. Its height is 72 inches. Loading height, or floor of body, is 16 inches above the ground. Inside body height is 76 inches.

There is additional loading space up in front of the body, on one side only, depending upon whether right or left-hand drive is specified; either of the latter is optional. There are also a loading ramp, tail-gate and other rear door arrangements available, at the option of the purchaser. Since dual tires are not used on the rear wheels, the inside loading space between the wheelhousings is 61½ inches. Additional body lengths may also be available.

According to A. R. Perkins, president, some of the design features are covered by patents. The company is now tooling for the production of ten vehicles per day, and is planning to sell them through a distributor and dealer set-up. During the war, Mr. Perkins says, a large number of these vehicles were built for various uses in connection with military operations, such as field hospitals, ambulances, mobile repair shops, etc. Before the war, according to Mr. Perkins, they had built a number of such vehicles for oil companies, public utilities and others, for use as sales coaches. . . . He feels that there is a definite need for a 1½-tonner of this particular type, and stresses the fact that most of the component units are standard production jobs, on which service is readily available, practically anywhere.

●

Kennedy Named District Manager

THE appointment of J. E. Kennedy district manager, Dallas branch of United States Rubber Company, has been recently announced. . . . Mr. Kennedy comes to Dallas from the company's general offices, in New York, where he was farm tire manager for U. S. Tires.

ENGINEERED PARTS THAT *FIT* AND KEEP YOUR CARS AND TRUCKS *FIT* —

Wohlert CORPORATION LANSING MICHIGAN

WALKER
LEADS IN
JACKS

Feather-Ride Suspension

(*Continued from page* 110)

Since the deflection of the main coil springs automatically provides a measure of gauging the load carried, a calibrated plate is attached to the dust-cover around the springs, and a pointer, moving vertically with the main load-carrying member, provides a visual gauge by means of which the operator can closely approximate his loads carried, and the load limitation. This would help to avoid short loads, as well. This load indicator is standard equipment on all Feather Ride suspensions.

The matter of weight reduction, also stressed by the manufacturer, is brought about principally by the fact that each of the four main coil springs used, weighs but 15 pounds. Then there is also the weight reduction brought about by the elimination of all leaf spring accessories, such as multiple shackles, shackle-bolts, spring-clips, tie-bolts, U-bolts, radius-rods, torque-arms, compression-bars, etc.

The maximum travel allowance of spring deflection in the Feather Ride assembly's main coil springs is two inches. At rated capacity, figured at 17,000 lbs. per axle (34,000 lbs. on the tandem assembly), the springs are designed to deflect 40 percent, or only eight-tenths of an inch. Under the force of impact, road shock and centrifugal force, the springs are said to work only another one-quarter to one-half inch, providing less sidesway and better vehicle control.

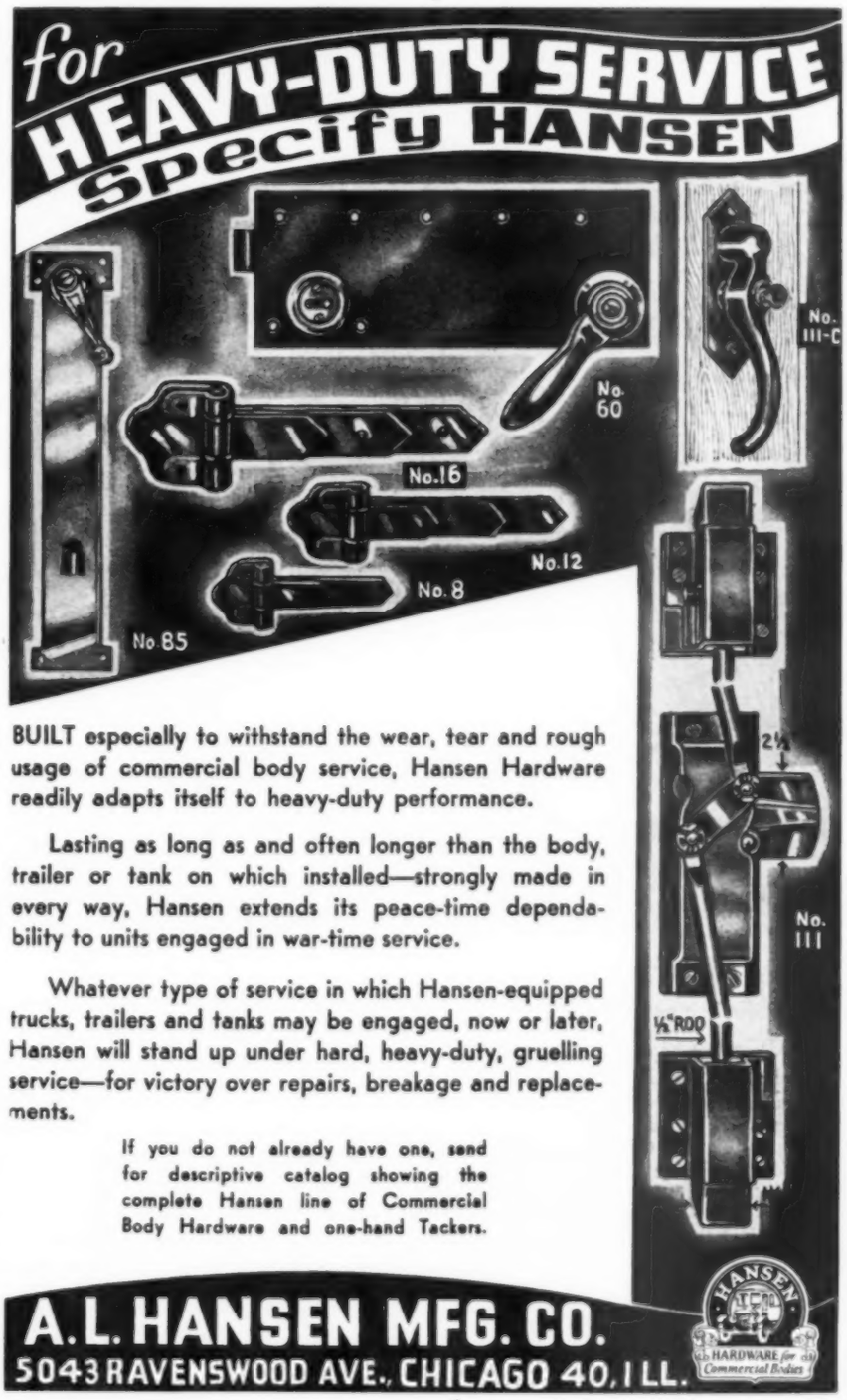
R. W. Pointer, president of the Feather Ride corporation, has been an advocate of coil-spring suspensions for many years. As owner of a trailer manufacturing firm in the Pacific Northwest, he first put his coil spring ideas to work on many highways and logging trailers, carrying loads ranging up to 200,000 lbs.

"We feel that the development of the coil spring will interest many fleet operators who must carry a variety of loads from light to very heavy," said Mr. Pointer. "In petroleum hauling, for example, where the equipment travels light one way and heavy on the other. With the underload spring feature, the empty tank thus gets protection against the heavy pounding that it would ordinarily get with 'one-way' springs designed for a full load."

Last spring the Feather Ride unit was placed upon the market, at which time the Feather Ride corporation was organized, to have complete manufacturing and sales rights. To date, distributors have been established in almost every state in the nation, including wheel and rim houses, trailer manufacturers, rebuilding firms, etc., all of which are said to now be adequately equipped with personnel and facilities to give thorough trailer service in their particular localities.

New Quarters for Chrysler Parts

TO help the company's 9,000 dealers better serve owners of more than 6,000,000 passenger-cars and trucks throughout the United States, the Chrysler Motor Parts Corporation recently started operation in new and larger quarters at 2985 Jefferson Avenue, Detroit, Michigan. . . . Known as the Mopar Building, the new site provides a total of 70,430 square feet of floor space containing all types of replacement parts for passenger-cars, trucks, and industrial and marine engines built by Chrysler Corporation. . . . The parts stocked, range from rivets to truck frames.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HEAVY-DUTY SERVICE
Specify HANSEN
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2½"
No. III
½" RDO
BUILT especially to withstand the wear, tear and rough usage of commercial body service, Hansen Hardware readily adapts itself to heavy-duty performance.
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Whatever type of service in which Hansen-equipped trucks, trailers and tanks may be engaged, now or later, Hansen will stand up under hard, heavy-duty, gruelling service—for victory over repairs, breakage and replacements.
If you do not already have one, send for descriptive catalog showing the complete Hansen line of Commercial Body Hardware and one-hand Tackers.
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You gamble with fire when you install only one type of extinguisher if you have hazards that call for two or more different types. Today's production, industrial growth and building expansion ought to have the maximum fire protection provided by Pyrene equipment. Specifically designed, tested and approved for each particular hazard it will give you maximum fire protection where and when you need it. Determine now whether you have adequate fire protection—if your extinguishers are ready to meet any emergency Ask your Pyrene jobber to show you how to properly protect your property.

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A fires
WOOD, TEXTILES, RUBBISH. USE PYRENE SODA-ACID, FOAM, CARTRIDGE-OPERATED OR PUMP TANK WATER AND ANTI-FREEZE TYPES.
for class
B fires
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C fires
ELECTRICAL EQUIPMENT WHERE EXTINGUISHING AGENT IS A NON-CONDUCTOR. USE PYRENE VAPORIZING LIQUID EXTINGUISHER.

Pyrene Manufacturing Company
NEWARK 8 NEW JERSEY
Affiliated with the C-O-Two Fire Equipment Co.

Low Temperature Sludge

(*Continued from page* 84)

Further tests in regard to efficient removal of oil contaminants were carried out with a full-flow filter whereby all of the oil leaving the pump is passed through the unit before reaching the engine. In view of the large capacity of this filter (3 gallons) the extra oil required was considered by conducting tests using the filter case alone. The results shown in Table VII indicate some improvement in performance due to the additional oil and some additional improvement with the complete unit.

Although efficient filtration of the oil greatly reduced engine deposits, full flow filters are generally considered to be impractical in service. Accordingly, tests were made with a regular size filter operating on the normal by-pass principle. Results indicate that without element change during the entire 40-hour period, little if any improvement in engine condition results. However, with the element changed at 20 hours, improvement is realized with respect to oil pan and cover plate deposits. No reasonable explanation is available to account for the increased piston deposits.

Crankcase Ventilation: Every effort should be made to keep the crankcase ventilation system clean, in operable condition and as warm as possible to alleviate stoppage due to freezing. Changes in crankcase ventilation are sometimes desirable. However, any alteration in the normal arrangement should be undertaken with great caution.

It was previously explained that engine deposits are associated with combustion contaminants consisting of water, fuel diluent and insoluble matter. Since some of the diluent and water vapor can be removed by crankcase ventilation, tests were conducted to investigate the effect of such ventilation on engine deposits.

Crankcase ventilation in the laboratory test engine is normally from the overhead-valve compartment downward with exit from the crankcase breather pipe. With normal test conditions, air is metered through this system at the rate of 1 cu. ft./min. thereby simulating road service. It will be observed in Table VII that an increase in crankcase ventilation from 1 to 3 cu. ft./min. reduces deposits to some extent, on the oil rings and pan and cover plates. In similar tests with the direction of air flow reversed, heavy engine deposits are experienced.

One further point which is usually not recognized in service operation is the possibility of breather system freezing. Figure 9 shows the condition of the breather system following one of the cold room tests mentioned previously. The system in this case was rendered completely inoperative due to accumulation of "snow" in the breather pipe.

Diluent and Water Extractor: Further investigations in regard to water and fuel diluent removal were conducted with the laboratory unit shown in Figure 10, designed to remove these materials from the crankcase oil during engine operation. From Table VII it appears that with sufficiently high oil flow, some improvement in oil pan and cover plate deposits may be obtained.

Devices of this nature are reported to be beneficial in some operations; their merits should be carefully determined for the particular service involved.

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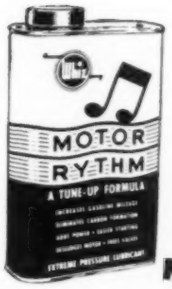
VEHICLES MOVING
ECONOMICALLY
with
HALL VALVE SERVICING EQUIPMENT
Ask Your Jobber or write
THE HALL MFG. CO.
TOLEDO, OHIO



Whiz

MOTOR RYTHM

an effective chemical tune-up

MOTOR RYTHM

A PRODUCT OF Hollingshead

LEADER IN MAINTENANCE CHEMICALS

Improved Operating Conditions: Marked reduction in engine deposits can be realized through employing heavy duty oil, high engine temperatures, frequent oil changes and a suitable oil filter with frequent element replacements.

From the foregoing discussions it is evident that low temperature deposits can be alleviated to some extent by changes in oil, fuel and various operating conditions. As an overall test of *some* of these corrective measures, a run was made with the standard conditions outlined in Table VI modified as indicated in Table VII. The results shown therein demonstrate the effectiveness of the alterations investigated. The engine was substantially clean at the conclusion of the run, as evidenced by Figures 4, 7 and 8. Employment of other aids such as increased oil viscosity, and better crankcase ventilation are additional possibilities for still further deposit reduction.

CONCLUSION—Great strides are being made towards overcoming the problem of low temperature sludge not only by the petroleum industry but by the engine manufacturers and fleet operators as well. With the knowledge that this type of sludge is not caused by the engine lubricating oil, engine manufacturers are giving careful consideration to the design of their new engines. Fleet operators are accepting the responsibility imposed by the maintenance and control of mechanical and operating variables affecting this condition. Through these combined efforts everyone is benefitting.

●

Clark "Tructractors"

(*Continued from page* 114)

nation's truck operators, whether highway transportation companies or manufacturers operating private trucks.

Fundamentally, Mr. Clark pointed out, the Clark Trucloader method is an essential expediting factor of production in that it speeds up the handling and distribution of essential goods and reduces the use of unskilled labor which has traditionally been the principal item in material-handling costs. The method serves the dual purpose of achieving faster, safer, lower-cost handling as well as releasing men to the learning of skills which increase their economic usefulness, he said.

First models of the Clark Trucloader were assigned for demonstration to leading plants in Battle Creek, and have produced a wealth of valuable performance data. Further introductory demonstrations are scheduled for thirty other cities, under the auspices of the local representatives of Clark Tructractor, Mr. Clark said.

The new unit is available in storage-battery-powered and gasoline-engine-powered models. Should further information be desired, it can be obtained directly from Clark Tructractor Division, Battle Creek, Mich.

●

IHC's West Coast Models

(*Continued from page* 106)

The rear axle of the W-3042-H is Timken's S-200 double-reduction type, with a selection of 3 gear-ratios of 6.42, 7.08, and 7.84 to 1 optional. The W-4042-OH is equipped with a Timken U-200 double-reduction rear axle, with gear ratios of 7.84 and 8.74 to 1 as optional. The 6-wheel highway-type unit, model W-4064-H,

PERFORMANCE

as great as the name

EDISON is a great name in electricity. Edison Laboratories keep it great by research and development . . . guaranteeing a quality plug with performance as great as the name. Edison's "SPUN-ON" Leak-proof Gasket, for instance, is the only design that insures a 100% compression-tight connection between spark plug and engine-block . . . and only Edison has it!

FLEET-OWNERS: Without cost or obligation to you, you can use Edison-Splitdorf's *Transportation Service Department* to make complete surveys of fleet units; studies of specialized ignition requirements; and instruction of mechanics in correct spark plug application for conditions of motor, load, and operation. Write for full information.

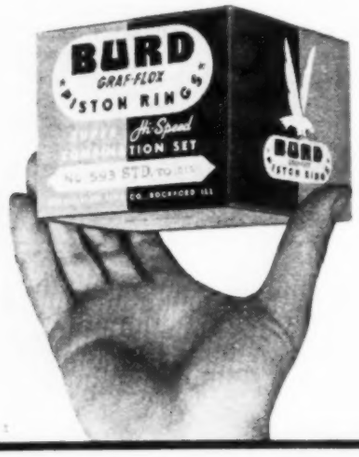
See your Edison jobber for spark plugs . . . and other *quality* products.

Edison

SPARK PLUGS

Edison-Splitdorf Corporation, West Orange, N. J.

Presenting BURD's *new* STANDARDIZED PACKAGE



Burd's entire line of "Graf-Flox" Piston Ring "Engineered for Results" Combination Sets and open stock is now available in new eye-appealing, easy-to-remember, easy-to-use cartons. By standardizing the boxing of all types of Piston Rings, Burd adds distinction in packaging to its reputation for quality of product. Watch for the striking new carton and ask for Burd "Graf-Flox" Piston Rings when ordering for your next re-ring job.

Burd "SUPER Hi-Speed" O. Rings are scientifically engineered to restore new-car pep and economy to badly-worn engines. The cast iron segment is "Graf-Flox" treated for quick seating.
BURD
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Burd "Hi-Speed" Compression and Oil Rings are "Graf-Flox" treated — no run-in required. They effectively seal highest compression pressures and maintain accurate oil film.

BURD PISTON RING CO. • ROCKFORD, ILLINOIS

is equipped with Timken's SW-3012 tandem-drive rear axle, with a ratio of 6.166 to 1. The W-4564-OH, W-6564-OH, and W-9064-OH are also equipped with Timken tandem-drive axles with suitable ratios available to meet various services.

All of the new International West Coast models are equipped with air brakes, front and rear. The 4-wheel models have semi-elliptic springs with auxiliary rear springs. The 6-wheel models have semi-elliptic springs with full-floating rear spring suspension. Steering gear is of the roller-bearing cam-and-twin-lever type, outboard-mounted for ease of adjustment and service. Disc-type wheels are standard on all models.

One feature stressed by International engineers is the special rubber-cushioned auxiliary transmission mounting, which facilitates the easy removal of this entire unit for servicing. Engines are 3-point mounted and rubber-cushioned.

With all of these models comes a new special 3-man cab which is to be produced at Harvester's Emeryville, Calif., plant for these heavy-duty units. This cab provides unusual visibility; all controls are easy to reach. It is 3-point mounted and rubber-cushioned against noise, vibration, road shock, and distortion. The extra wide 2-piece windshield and large door windows are noteworthy. The adjustable driver's seat has foam rubber cushions.

Standard cab equipment includes hot-water heater, fresh-air ventilating system and defroster, screened cowl top and side ventilators, ventilating windshield wings, dual windshield-wipers, dual sun-visors, rear-vision mirror, and dome-lamp. Provision is made for the installation of radio receiver or 2-way radio equipment. In the design and construction of the International cab everything possible has been done to provide complete driver comfort and convenience, according to International Harvester engineers.

•

Survey on Engines

(*Continued from page* 72)

Cooling System: Thirty-six of the heavy-truck users are satisfied with water-cooling, apparently, while 3 suggested air-cooling. For thermostats 24 expressed a choice for the by-pass type, and 7 are satisfied with the ordinary type, without the by-pass. The packless-type of water pump got 28 votes, as against 5 for the old-fashioned, "pack-it-yourself" type. Cooling fans with solid, non-adjustable blades received 24 votes, while the relatively new type of fan, with thermostatically-controlled, adjustable blades, received 12 votes — also a rather large number, it appears.

Valve-Seats, Pistons, Sleeves: Most of the heavy truck users (22 to be exact) asked for valve-seat inserts on all valves; 15 suggested that these be used on the exhaust valve seats only; and 1 operator said that he'd rather not have any inserts at all. The question of aluminum vs. iron pistons for heavy truck engines brought 28 votes for aluminum and 8 for iron. Twenty-seven operators asked for cylinder-sleeves — 17 dry-type and 10 wet-type; while nine seemed willing to do without sleeves on heavy truck engines.

Lubrication System: "Pressure to all bearings" was again the leader, with 34 votes, while "Pressure to Mains and Rods Only" got 3 votes; in other words, all of these heavy truck users want pressure lubrication of *some* kind. Oil filters brought 25 votes for the cartridge type, 1 for Fuller's earth

PYRENE KEEPS 'EM ROLLING *with*
Rugged, longer-wearing Tire Chains and Handy, speedy Fire Extinguishers

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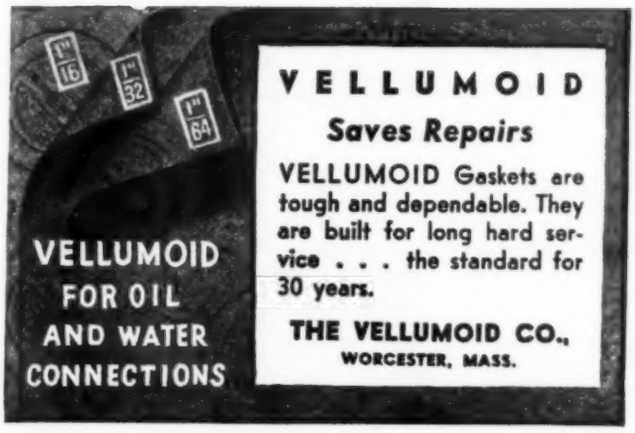

Self-Contained Fire-Fighting Units

SEVERAL fleets of inter-city buses are installing a newly designed fire-detecting and extinguishing system.

The system uses carbon dioxide as the fire-fighting element and does not damage the motor, ignition or any other part of the vehicle. It is non-toxic and adds only about 85 pounds in weight to the vehicle.

The system of cylinders containing the chemicals can be located in any part of the bus as well as at the motor. Tiny little flame-detectors can be placed wherever desired and immediately signal the operator at the first flash of fire.

The unique feature of the operator's control mechanism is that he can at any time test the operating condition of the system.

type, and 1 for the "built-in" type. The oil-gauge question brought 22 votes for the hydraulic type and 15 for the electric. More interest was expressed in the crankcase level indicator, this time, 29 fleets asking for it; and 3 not wanting it. We thought that everyone would be "for" crankcase ventilation; however, 2 fleets said "No" on this question, while 34 indicated that they definitely want crankcase ventilation on heavy truck engines. The floating oil-intake screen received 15 out of 32 votes cast, the other 17 replies calling for the old-fashioned stationary or fixed type.

Fuel System: Starting with the fuel-pump, the votes were 23 for the mechanical type and 18 for the electric type. Down-draft carburetors were preferred by 31 of these heavy truck users, while the up-draft type claimed only 4 advocates. The oil-bath type of air-cleaner got almost unanimous choice, with 36 votes, while the plain type only received two. On the question of automatic chokes, 22 of these heavy truck users do *not* want them, while 13 suggested that they would.

Timing & Electrical: Gears, again, were preferred by most of the heavy truck users, instead of timing chains. Gears got 26 votes, while chains got but 9. Battery and distributor ignition received all 25 of the votes cast, excepting one which went to magneto ignition. On starter drives the preference was again somewhat indefinitely expressed, as follows: "Bendix-type"—5; "Clutch-type"—3; "12-volt type"—1 "Solenoid-type"—1. Three different spark plug sizes were mentioned. The 14-mm. size got 13 votes; there were 9 votes for the 18-mm. size and 1 for the ⅞" size. Again, overwhelming preference was expressed for generators with voltage-regulation, which pulled 35 votes; two fleet men asked for the old-style third-brush type of generator.

Governors: Eighteen, out of our 39 heavy truck users, checked governors as being desirable, 11 calling for the mechanical type and 7 for the velocity type.

Air Compressor: As the trucks get heavier, the built-in air-compressor

(*Please turn to page* 184)

FOR THOSE Door to Door DELIVERIES
No. 4877
No. 4878
No. 5613
NO. 575716-A
ADJUSTABLE SWIVELING PEDESTAL
NO. 575717 "PEDALOC" SWIVELING
TILTING PEDESTAL
The Eberhard line contains many items specifically designed for door to door bodies. A few are illustrated here.
Above is the popular No. 565694 SLAMTITE Medium-Duty Lock with finger-hook latch and tapered bolts that pull door tight when slammed.
At left is an application of the No. 565698 Slam Lock to folding doors.
Eberhard thin slam action locks also include the "Recesso" No. 4877 Slam Lock, No. 4878 Slamtite, and No. 5613 Slam Action Lock.
At the lower left are two of an assortment of Eberhard seat irons, including a type for every purpose.
For such small jobs such as these or for the largest truck bodies, you will find just the material you need in the Eberhard line.
Consult the Eberhard Catalog
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AUTOMOTIVE HARDWARE
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The first Automobiles in America carried Tool Kits made by WALDEN WORCESTER.

The New Automobiles will carry less tools: But the Mechanics—will need New Tools designed by WALDEN WORCESTER Engineers to meet the New requirements.

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STEVENS WALDEN, INC.
468 SHREWSBURY STREET
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Survey on Engines

(*Continued from page* 183)

seems to get more popular. Twelve of the heavy truck fleet operators said that they would like a built-in air-compressor on post-war engines. Eleven said that they did not; and that was all the answers received on this one.

ENGINES FOR TRACTOR-TRAILERS: There were 21 fleet men participating in this survey who checked the tractor-trailer as the principal vehicle type used in their fleets. All 21 of these voted for the gasoline engine as a source of post-war power. Under the following sub-heads are tabulated the particular design and equipment features preferred by these 21 fleet men:

Number of Cylinders: For tractor-trailer engines, the six-cylinder, in-line type of engine was the unanimous choice. Twelve asked for overhead valves and 9 voted for the L-head design.

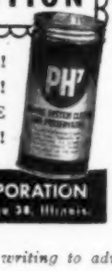
Cooling System: The votes on water- vs. air-cooling were 17 for water and 4 for air. On thermostats, 13 asked for the by-pass type, while 5 wanted the plain type, without the by-pass. The packless-type of water-pump polled 16 votes, with 3 going to the type that you pack yourself. Cooling fans with solid, non-adjustable blades received 14 votes, while the relatively new type of variable pitch fan, with adjustable blades, was desired by 6 fleet men.

Valve-Seats, Pistons, Sleeves: Again most of the tractor-trailer users voted for valve-seat inserts. On all valves the count was 15 votes; 3 were cast for "exhaust only", and 1 operator wants no inserts, in any place. The question of iron versus aluminum pistons brought 16 votes for aluminum and 5 for iron. Eleven of these operators asked for cylinder sleeves; 6 for the dry-type and 5 for the wet-type. Seven want no sleeves at all in these engines.

Lubrication System: Twenty (out of 21) operators of tractor-trailer engines want full pressure lubrication to all bearings; one did not answer the question. Twelve of them voted for oil filters, of the large "cartridge" type. The other 9 did not answer, although this is not to be

(*Please turn to page* 190)

PH7 2-WAY EVERY-DAY Cooling System PROTECTION



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2 STOPS FURTHER CORROSION!
GUARDS AGAINST ANTI-FREEZE WASTE—COSTLY REPAIRS!

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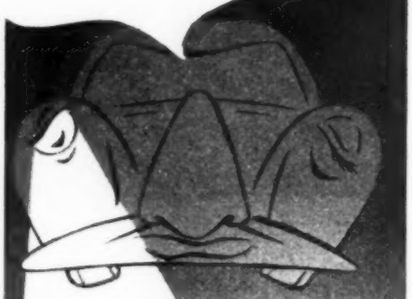
What I need is a good



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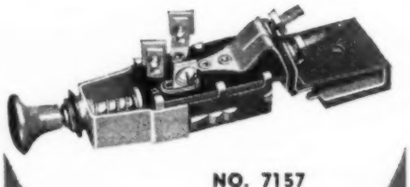
with circuit breaker



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Spring inspection time is almost here and with it comes the need for replacing worn out electrical equipment. When you supply Cole-Hersee quality replacement parts you can be sure of two things: that they meet specifications and that they deliver satisfaction.

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Dash Lamps
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Dimmer Switches
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Quality ELECTRICAL AUTOMOTIVE EQUIPMENT

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54 OLD COLONY AVE. BOSTON, MASS.

Urges Repeal of 3% Transportation Tax

AT its recent Annual Convention in Nashville, Tennessee, the Tennessee Motor Transport Association adopted a resolution by unanimous vote for repeal of the wartime emergency 3% tax levied on common carrier transportation charges.

The Association resolution claims, "that the primary justification of this tax no longer exists; that it is not justified by revenue accruing to the Federal Treasury, is difficult of interpretation and administration and imposes large collection costs which cannot be afforded by motor carriers."

•

Penna. & Kentucky Join Anti-Diversion List

KENTUCKY and Pennsylvania, in the elections of last year, joined the growing list of states which are safeguarding their highway revenues by constitutional amendments which prohibit the use of motor vehicle taxes for non-highway purposes.

The action of the Pennsylvania voters in dedicating highway funds for highway purposes sets the pace for the other three great Eastern states of New York, Illinois and Ohio which diverted, over the ten years from 1934 to 1943, respectively, the sums of $533,000,000, $68,826,000; and $122,596,000.

The successful campaign in Pennsylvania was under the patriotic sponsorship of the Pennsylvania Good Roads Association whose public education activities for this amendment resulted in a vote of almost seven to one for its enactment. The Kentucky amendment, under the sponsorship of the Kentucky Good Roads Federation, achieved equal success with a vote of almost four to one in its favor.

The eighteen states which now have anti-diversion amendments are: California, Colorado, Idaho, Iowa, Kansas, Kentucky, Maine, Michigan, Minnesota, Missouri, Nevada, New Hampshire, North Dakota, Oregon, Pennsylvania, South Dakota, Washington and West Virginia.

The Legislatures of Indiana and Tennessee have passed anti-diversion constitutional amendments, but in both states they must pass the next Legislature before submission to the voters. Texas has also passed an amendment that will be submitted to the general election in 1946.

Diversion of highway funds remains a serious threat to improved highway transportation in America. For all states in the last pre-war year of 1941 alone, this amounted to $219,039,000.

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BATTERY HYDROMETER

Has shatterproof glass jar. Gives highly accurate readings corrected for temperature. Simplifies testing — gives service instructions on barrel. Easy to read . . . handy to use . . . compact.

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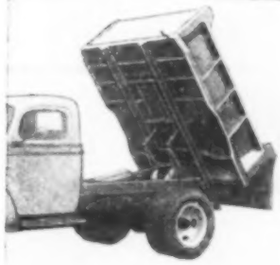

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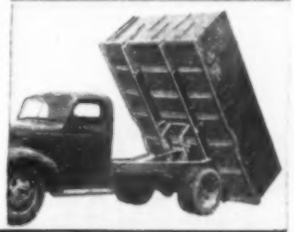

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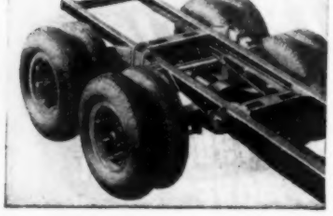

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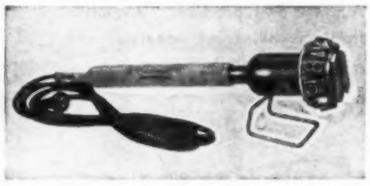

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Review of Highway Transport Activities

NOW that the last of ODT's Highway Transport Department's offices have closed, and its job finished, it may be interesting to review the various activities of this department, from its inception to the date of its closing.

The ODT Highway Transport Department was organized in June 1944 through the consolidation of the divisions of motor and local transport, established in December 1941 and January 1942, respectively. Personnel at the time of the consolidation totalled 3,896 employees, including 177 in Washington and 3,719 in the field. In July 1944, at the peak of its activities, the department's field organization included nine regional offices, 142 district offices and 30 branch offices.

Known chiefly to the public for its local delivery restrictions and local transit conservation measures, the department, however, was responsible during the war period for determining the nation's motor transportation policies, coordinating and regulating the use and distribution of transportation facilities for war and essential civilian services, and formulating conservation measures.

In addition, it compiled estimates of motor vehicle requirements and made recommendations to the War Production Board for materials and equipment and to the Petroleum Administration for War for petroleum products for all forms of highway transport—trucks, buses, taxicabs, rental cars, street and electric railways, rapid transit systems and passenger-cars.

The department's wartime control and direction of rubber-borne transportation was largely effected through its Certificate of War Necessity program, its program of joint-action plans participated in by over-the-road, agricultural, and local-delivery truckers and by taxicab operators; through promotion of its conservation measures and vehicle maintenance program by various motor transport industry advisory committees; by the rationing of trucks and buses; by restrictions on wholesale and retail deliveries; and by conservation limitations on local transit and inter-city bus service.

The Certificate of War Necessity program was designed as a means of control to confine operations of commercial motor vehicles to activities essential to the war effort and the maintenance of essential civilian economy through limitations on commercial motor vehicle mileage and fuel and establishment of minimum load requirements.

Consequent reductions in commercial motor vehicle operation achieved untold savings in gasoline, rubber,

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replacement parts and manpower, and effectively prolonged the productive life of the nation's commercial motor vehicles. During the three years of the program's operation, ODT certified about 18,750,000,000 gallons of gasoline for the operation of more than 5,200,000 commercial motor vehicles.

In an effort to reduce its expenditures, the ODT transferred certain of its commercial gasoline rationing duties to the Office of Price Administration in October 1944, making possible a reduction in personnel.

Plans for the department's demobilization were also outlined in October 1944 with actions scheduled to be taken as speedily as possible and in order of feasibility, following V-E and V-J Days. Various district and branch offices were consolidated, 66 of them being closed before V-J Day.

Shortly after the collapse of Germany, the department freed integral buses from rationing, modified its regulations to permit new local motor carrier operations, granted preference to veterans applying for Certificates of War Necessity, and revised its procedure for the allocation of new light and medium trucks.

On Aug. 16, two days after the fall of Japan was announced, the ODT cancelled its Certificate of War Necessity program, lifted its minimum loading and back loading requirements governing over-the-road truck operations, modified its restrictions on local cartage service, revoked its regulations governing taxicabs and rental cars and lifted the ban on racing.

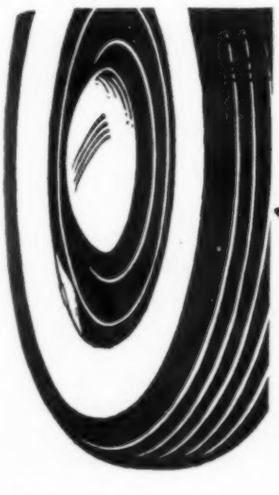
In rapid succession shortly thereafter, the ODT revoked its remaining highway transport orders and regulations. It withdrew its statement of policy on local passenger operations, effective Aug. 31; moved to lift its truck rationing controls by removing its certificate of transfer application requirements, on Sept. 22; and revoked its frequency restrictions on wholesale and retail deliveries, effective Nov. 1. . . . Almost all highway transport controls were lifted before Sept. 15 and the remainder on or before Nov. 1st.

●

Oklahoma Group Studies Road Needs

THE Eastern Oklahoma Highway Development Association, recently organized in Tulsa, is engaged in a program of cooperation with the State Highway Department, designed to obtain maximum results in post-war highway development.

The Association is making efforts to enlist the support of states bordering Oklahoma on the East, Northeast and Southeast, on roads entering the state from these other jurisdictions.



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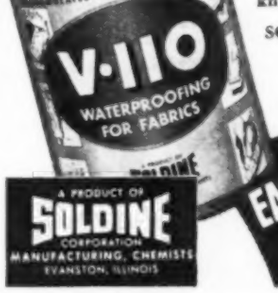

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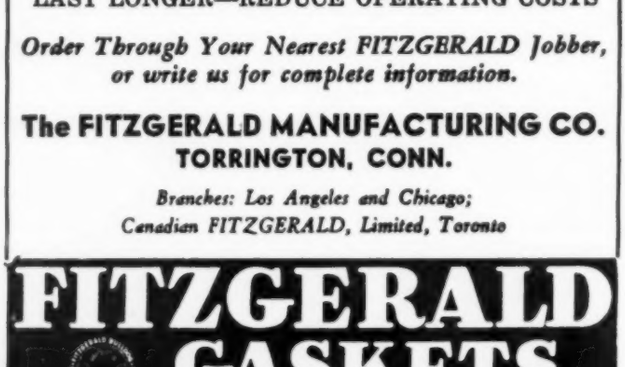

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"World's Greatest Highway" Begins

NEW YORK's Governor Dewey recently announced that construction work will soon start on the "Greatest Highway in the World," the already-famous $202 million 486-mile highway to cross the State from New York to Buffalo and on westward to the Pennsylvania Line.

"There is now no fast highway transportation from Buffalo through the State of New York. The 450-mile thruway from New York to Buffalo has been designed to meet this great need. It is now in sight," he said. "The rest of our highway program, I believe, leads the whole United States. Within 30 days after the surrender of Japan, we were able to award the first construction contracts and the work is now under way."

Construction work bringing jobs for thousands, will start at 3 separate points—in the western and central parts of the State, and at one point near New York City.

The Thruway is one of the largest single undertakings ever launched by any state or nation. One terminus will be at the northern New Jersey—New York State Line where it will draw traffic over high capacity arterial connections from New York City and northern New Jersey metropolitan connections. From there it will extend in a northerly direction parallel to and west of the Hudson River, then through the Mohawk Valley and west to the Pennsylvania State Line near Erie. Its purpose is to provide for private and commercial traffic a modern, high-speed thoroughfare located outside population centers, yet serving areas in which 80-90 percent of the State's population live. Besides linking New York City, Albany, Schnectady, Utica, Syracuse, Rochester and Buffalo, the Thruway will connect Canada's Queen Elizabeth highway, which extends from Toronto to Niagara Falls.

Planned as an express highway with two main arteries of opposing traffic, each having three lanes and separated by a 20-foot wide wall, the Thruway will eliminate all railroad, highway or private grade crossings and will not have traffic lights. Its smooth alignment will afford long-sight distances, easy curvatures and relatively flat grades and thus make possible a travel speed of 85 miles per hour.

To and from the express lanes, about every three miles in rural sections and more frequently near cities, will be accelerating or decelerating lanes, designed to permit an adjustment of speed from the prevailing rate on the main arteries to a rate of 5 to 10 miles an hour.

The huge project will take about five years to build.

About $20 millions worth of construction is expected to get under way in 1946, and by 1948 the total construction per year should reach $60 millions. Work will begin first on the sections that promise greatest relief for traffic congestion—notably the Erie and Ontario Thruways and the middle section of the Catskill Thruway.

Although movement of through traffic will be greatly facilitated by the Thruway (it will be possible for a loaded truck to make the trip from Buffalo to New York in eight hours) short hauls between neighboring cities or within one metropolitan area—with high speed door-to-door package deliveries from neighboring communities and travel by express and local luxury busses will also be important.

The Niagara Thruway is designed as the backbone of the State's highway transportation system. By linking our principal cities and serving the State's most populous, busy areas, the Thruway will draw together those ingredients which have made New York State great in industry, labor, commerce and business, Mr. Dewey said.

●

"Virginia Highway Facts" Now Available

DURING the decade 1934 through 1943, the receipts for highways in Virginia amounted to $247,580,000 and were derived from the following sources. Motor vehicle fuel taxes, $126,879,000; registration fees and tolls, $62,974,000; motor carrier taxes, $3,640,000; appropriations from general funds, $361,000; state road tax levies, $325,000; sinking fund earnings, $13,000; Federal aid, $41,672,000; other Federal funds (mostly PWA grants); $361,000; local funds received for state highways, $688,000; for debt service, $5,215,000; for construction, etc., $4,967,000; and under miscellaneous, $485,000.

Over the same period, the disbursements totalled $236,860,000, for: Cost of collecting motor vehicle imposts, $5,799,000; State highway construction, $197,677,000 (the latter sum allocated for construction and R/W, $109,472,000; maintenance, $52,447,000; equipment, engineering and administration, $11,904,000; highway policing, $2,311,000; debt service interest, $2,707,000; debt service principal, $18,836,000); for local roads and streets, $22,495,000 and for non-highway purposes, $10,889,000.

These figures are calculated from data in the *"Highway Facts"* studies being issued by the National Highway Users Conference for each state. . . . Single copies are available for a number of states at $1.00 each; quantities of ten or more, 75c each.

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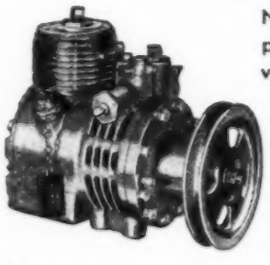

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"KING" Arc Welders are giving satisfactory service in thousands of repair shops in this and many foreign countries. The new "KING" Arc Welder Type W-7 is streamlined and important features have been added. Materials ranging from 22 gauge to 3/4" can be welded, using coated welding rods from 1/16" to 1/4". It has a capacity of 250 Amperes with 18 heat stages ranging from 15 to 250. A plug-in arrangement for each stage permits easy and quick changes without the use of switches.

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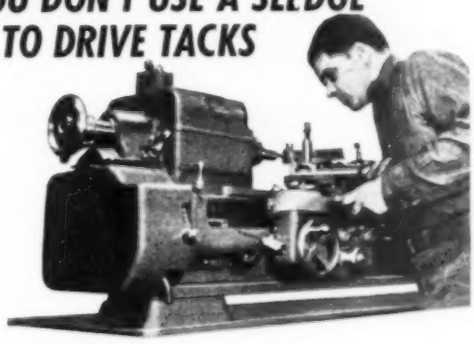

There was a time when machine tools had to be heavy to be accurate but modern engineering and manufacturing methods have changed that. Today, the fully equipped shop has its big lathes for big work, and SHELTON S-56 Precision Lathes for small parts. With Accuracy that will hold the closest tolerances and the stamina to stand up to continuous high speed operation, these smaller, handier, moderate priced lathes are cutting the cost of and increasing the hourly output of small turned parts.

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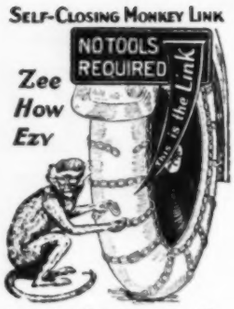

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Survey on Engines

(*Continued from page* 184)

construed that they don't want filters, since pretty nearly everyone does. The oil gauge question seemed evenly divided, with 10 votes counted for the hydraulic type and 9 for the electric type. Nineteen (out of 21) asked for a crankcase level indicator of some kind. And again, opinion was expressed unanimously for crankcase ventilation, all 21 tractor-trailer operators voting for it. In regard to the oil-intake screen, 8 voted for the stationary type, while 7 asked for the floating type.

Fuel System: The mechanical fuel-pump led again with 15 choosers, while the electrical fuel-pump pulled 6 votes. All 21 of these fleets asked for the down-draft carburetor. Far in the lead was the oil-bath air-cleaner this time, with 17 votes, as against 3 for the plain wire-mesh type. On the question of automatic chokes, the unpopularity of this gadget among tractor-trailer users was reflected in the answers, which were 14 against, and 6 for them.

Timing & Electrical: Gears again led with 15 votes, for the timing train. Four operators asked for timing chains instead. Battery and distributor ignition got all 6 of the votes cast. What the other 15 operators want, they did not say. Preference on starter drives was again indefinite, with such answers as "Gear type" and "Any good", etc. Spark plug sizes were also spottily mentioned as follows: "14-mm."—3; "18-mm."—4; "⅞-inch"—1; and "Large"—1. Far in the lead once more was the voltage-regulated generator, with 19 votes, as against 1 for the old-style third-brush type.

Governors: Somehow or other, there were only 8 votes cast for governors, six being for the mechanical type and 2 for the velocity type. Just why 13 of the 21 tractor-trailer operators ignored this question, we have not been able to determine.

Air Compressor: Only 11 votes were counted on the built-in air-compressor. This was wanted by 8 fleets, and not wanted by 3 fleets. And that's all on tractor-trailer engines.

(*Editor's Note:* Because the subject matter of this article is quite lengthy, it has been decided to present the balance of this survey report in our next issue. This will include the data on bus and passenger-car engines, which it is felt are important enough to warrant a separate feature article.—*Ed.*)

●

U. S. Rubber Opens Office in Detroit

THE Gillette tire division of the U. S. Rubber Company has opened a district office in Detroit, it was announced recently by H. C. McDermott, Gillette sales manager. . . . R. B. Frye, district manager for Gillette, will be in charge.

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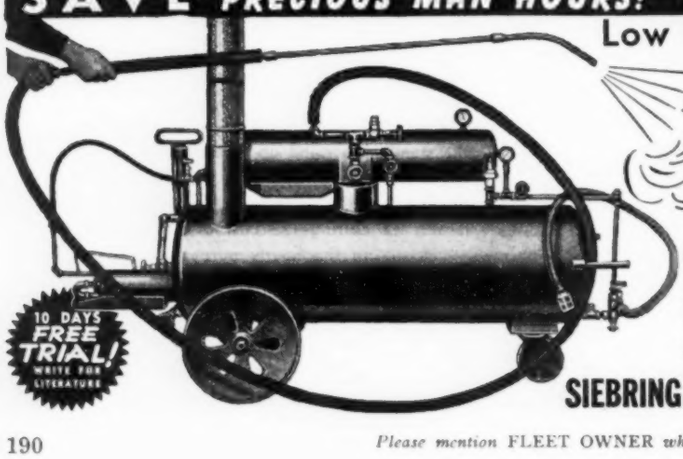
Low Cost . . . Efficient . . . Portable!



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Diesel Fuels Outgrowing Cetane Yardstick

A NEW "Power Performance" or "Service Rating" shortly must replace the cetane number and diesel fuel index, it was recently predicted by C. M. Larson, of Sinclair Refining Co., New York, N. Y.

Mr. Larson reported the results of tests with diesel locomotives as indicating that the additive, amyl nitrate, promises to play an important part in development and use of super-charged diesels. Low cetane number fuels conservatively doped with the additive, he explained, assure satisfactory engine performance.

Addition of chemical agents to diesel fuels has created new concepts of fuels, engines, and power-producing possibilities, Mr. Larson added, with the result that specification requirements built around straight-run petroleum fuels have become obsolete for purposes of fuels classification.

He declared that by adding a small quantity of amyl nitrate to diesel fuel of 44 cetane number, a diesel engine can be made to produce the same power output per gallon per hour as on 50 cetane number undoped fuel.

•

New Developments in Traffic Surveys

NEW techniques in traffic surveys have been developed by the Public Roads Administration in collaboration with the Bureau of the Census, State Highway Departments and local planning authorities, which reportedly will prove not only more effective than previous types of study, but also more economical. This plan has been used with excellent results in over thirty cities and is to be extended as post-war planning gets under way.

The procedure follows the sampling method used in polls of public opinion. The first step in making these surveys is to select a predetermined percentage of dwellings in various sections of a metropolitan area for conducting interviews in the home. Ten percent sampling has proved satisfactory in cities of 100,000 to 300,000 population; five percent sampling is taken in cities of 500,000 population and in the very large cities one address in twenty-five or thirty dwelling units is considered ample.

The questionnaire method involves data regarding the preceding day's trips made by automobile, bus or street car; the origin and destination of the trip; purpose of the trip; time of starting; the location and purpose of various stops; and the use of parking facilities. In some cases, family income is also recorded, to determine what volume of traffic may be affected by economical matters.

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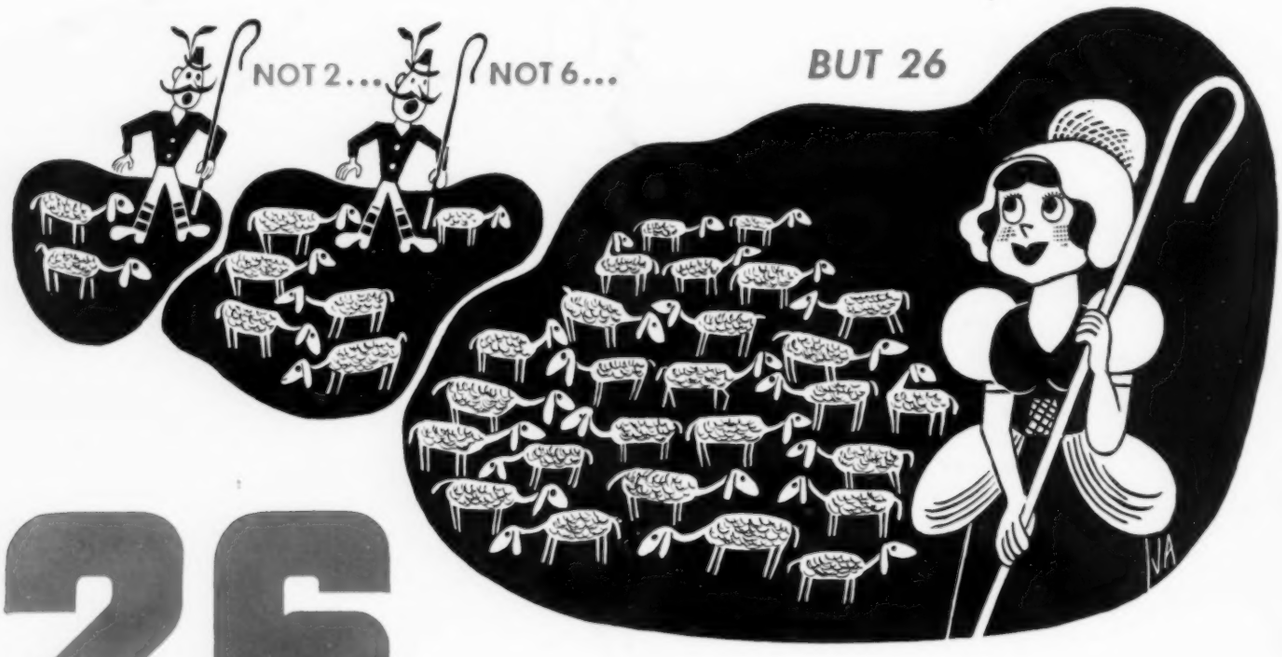

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